

TEACHING OF GEOGRAPHY
AND
NATIONAL INTEGRATION

National Integration Series

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Editors

T. S. Mehta
Prabhakar Singh
R. S. Vashisht



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FOREWARD

TEACHER is an important factor in bringing about any improvement in school instruction. One of the major programmes that the NCERT has taken up is the preparation of instructional materials for teachers. The National Integration Unit has produced several books for children with a specific purpose of fostering National Integration. The present brochure on Teaching of Geography with a view to foster national integration, is another effort in this direction. The brochure is meant for teachers at the secondary stage.

The first draft of this brochure was prepared by a group of subject specialists. These specialists were drawn from all over the country including some from the Council itself. The manuscript was then scrutinized by a working group consisting of knowledgeable persons. Finally, it was edited by a team of editors consisting of Shri Prabhakar Singh, Dr. R.S. Vashisht and Prof T.S. Mehta. We are thankful to all those who contributed towards both the development and improvement of this brochure. It is hoped that the teachers will find it useful.

The National Integration Unit of the Council would welcome any comments for improvement of the brochure

SHIB K. MITRA
Joint Director

NCERT;
New Delhi.

PREFACE

SOME three years ago, the Council brought out a small brochure entitled, 'the Nation and the School' which contained suggestions for adopting proper approach to the teaching of languages and Social Sciences at the school stage from the stand-point of national integration. The brochure was widely appreciated and it had to be reprinted soon. It was further felt that there should be handbooks for teachers giving more details for proper orientation of teaching for various Social Sciences subjects. The National Integration Unit, therefore, took up a project for developing a teachers' handbook for the teaching of Geography at the higher secondary stage. The present volume is an outcome of this project. It contains both the conceptual framework of the approach and illustrative teaching units. The intention is to give the teachers, through samples of teaching units, the idea of how to foster the spirit of national intergration while teaching various topics in Geography.

In developing this handbook we have sought the collaboration of a number of knowledgeable persons in the field of Geography teaching. We have taken their help at the planning, writing and reviewing stages. Finally, the draft was edited by a team of Council's specialists.

In this connection I wish to express my gratefulness to Shri Gopal Singh, Shri J. S. Chauhan, Dr. L. R. Singh, Dr. L. N. Verma, Shri M. S. Sinha, Shri M. P. Rajgopal, Dr. N. A. Siddiqi and Shri R. S. Verma for help in writing various portions of this brochure and to Shri K. P. Kshirsagar, Dr. K. P. Dhurandhar, Dr. M. Taher, Shri M. L. Ranjen, and Dr. P. C. Kumbhat, for helping in the vetting of the draft. I also wish to express my thanks to Shri Prabhakar Singh and Dr. R. S. Vashisht for contributing to the writing of the brochure and for help in editing it and to Shri B. S. Parakh for participating in the reviewing group meetings.

(viii)

In the end, I am hopeful that this handbook will prove useful to teachers of Geography at the secondary stage. Any suggestions for its further improvement will be most welcome.

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and Humanities, N C E R T.

CONTENTS

Part I

Chapter 1	National Integration · Some Basic Issues	.. 1
Chapter 2	National Integration and the Role of Geography	... 8
Chapter 3	Teaching of School Geography : Some Desirable Emphases	. 19
Chapter 4	Some Issues in Teaching Practices of Geography	. 28

Part II

Sample Teaching Unit

Unit I	India's Size and Location	... 51
Unit II	Surface Features of India	... 75
Unit III	Climate of India	... 87
Unit IV	National Vegetation of India	. .103
Unit V	Soils of India	...121
Unit VI	Transport in India	...131

PART I

CHAPTER I

National Integration : Some Basic Issues

EDUCATION is the process which transforms students from one state to another. It brings about a change in mental and physical behaviours of students. To bring about this change teachers introduce students to information, concepts and skills which seem relevant to their lives. Now, one of the important aims of education is to help students develop into responsible citizens of their country, those who have imbibed the spirit of mutual understanding and respect and who have the country's interest at heart first and foremost.

A. What is Integration ?

Every individual attempts to satisfy his own desires and to achieve his own highest happiness and well-being. But this aim, if followed without any regard for others may result in conflict between individuals and groups. "This purpose (i.e. to achieve one's highest happiness and well-being) can be realised when we promote and intensify our positive co-operation with each other. Thus, social co-operation is the means by which each of us can maximise our satisfaction."¹ But, how can the objective of Social co operation be achieved ?

Integration, according to Clarke (1960) is a process - subjective and individual process--which "involves attitudinal change and removal of fears, hatreds, suspicions, stereotypes, and superstitions."² It means

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1. Hazlitt H., *The Foundations of Morality*, Von Nostrand Company Inc, London (1964), pages 354-358.
 2. Quoted in "concept of Integration" by P. K. Roy, *Journal of Social Research*, Vol. XIII, No. 2, September, 1970.

that the aim of social co-operation can be achieved through attitudinal changes which can remove our prejudices. The broader purpose of education is "to harmonize our attitudes and actions so as to make the achievements of every one's aims, as far as possible, compatible."

But, how can prejudices be removed? Generally speaking there are three important causes which make a person prejudiced. They are :

(1) Findings reveal that prejudices against members of other groups are basically symptoms of an unadjusted personality. It means that prejudices are in large part a problem of personality adjustment.

(2) Ignorance of each other's ways and lives has been a cause of suspicion and mistrust between the peoples throughout the history of mankind.

(3) Prejudices are also passed on by parents or friends and by propaganda or public opinion.

In this connection it will be worthwhile to know what the symptoms of a prejudiced person are.

(1) Generally a prejudiced person blames others for his misfortunes.

(2) He is often envious of the status of others.

(3) He is either suspicious of others or fearful towards others.

Now, the next question is as to what the ways of remedying the prejudices are. This can be done by two ways, both of which have to be adopted :

(1) Training the mind through developing rationality—Rationality can be developed in "an atmosphere of enthusiasm, inquiry, and mutual respect." Atmosphere for good emotional adjustment and a spirit of inquiry are the two important bases for developing rationality.

(2) Training of untutored emotions—Emotions are always a part of reality in any situation but they are often ignored. "The emotional ingredients of work are ignored to our peril." But the difficulty is that we do not know how we can translate the energy of emotions into the effective force of character. For example, one important feeling is commitment in participation. This feeling ought to be used to the utmost benefit of the students.

Consequently, the aim of any programme for attitudinal change ought to be to develop both the generosity of spirit and the maturity of mind.

In spite of good efforts it may be possible that cent per cent success is not achieved because some students are resistant to change. It will be worthwhile to know why they are so.

Which prejudiced persons are resistant to change ?

(1) Individuals whose parents have feelings of superiority and maintain strong bonds of authority in their homes.

(2) Individuals who identify themselves with some cause.

(3) Individuals who exhibit hostility towards authority because of their emotional starvation during early years of life.

Thus, inner conflict and insecurity of persons create an emotional need to adopt a prejudice.

For an educator, therefore, integration is a functional concept which demands the coherence in the activities of the diverse groups of an organic society for the purpose of benefitting all. This may best be promoted by a common mean, that is, social co-operation.

B. National Integration : Its Meaning

In the words of Dorothy Thompson national integration is a feeling that binds the citizens of a country. For Preston "the job is to inculcate knowledge of our country, pride in it, and respect for the best in our national environment, aspirations, and traditions, and a wish to improve our country."³

National Integration means the realisation of the basic unity of the country, it implies doing away with inter-state, inter-linguistic, inter-religious and inter-cultural differences, and of fostering a spirit of tolerance, respect and an appreciation of the view-point of those belonging to other states or other linguistic, religious and cultural groups.

National Integration, therefore, implies a realisation of the fact that there can be unity in diversity. The feeling of overall oneness of the nation results in fostering National Integration.

3. Preston, R C., Teaching World Understanding, Prentice Hall Inc, New York (1955), page 7.

Another positive aim of National Integration is to put individual's best efforts for the optimum growth, prosperity and welfare of the country as a whole.

Our country has great diversities of relief, climate, products, ways of life, customs, languages, religions and culture etc. Most of these are creations of geography. There is however, an underlying basic unity-the unity of Indian culture. It is essential, therefore, to preserve our unity in diversity and to put a stop to group polarization so as to ensure optimum economic and social progress. It is equally important for pupils to appreciate regional and economic cooperation in the task of building up of the country.

C. Basic Issues of National Integration

a) Vastness of the country :

Our country has an area of 3.6 million Square kilometres and is one of the biggest countries of the world. It has population of 5.50 million. (1971) distributed unevenly. The long boundary of our country, passing at places through the inhospitable terrain, borders many countries and at times poses serious geopolitical problems. There are many physical diversities in India, the Himalayan Mountains in the north, the vast Sutlej-Ganga-Brahmaputra plain in the middle, the great Deccan Plateau in the South and the long coastal plain bordering the Plateau on the east and the west. Our country has vast resources, both natural and human. The natural resources such as agricultural products, forest wealth and mineral resources are not evenly distributed within the country. Such geographic diversities may lead to certain misconceptions in the minds of the people that India is not one whole geographical entity; but just a conglomeration of various regional or physical units. A country with such a vast expanse and diverse resources at times may also lead to the weakening of national consciousness. As such, there is always a need to present the total image of our country.

b) Diversities :

The country presents a remarkable socio-economic diversities particularly in languages, religions, food-habits, dresses and customs etc. There is therefore, always a need to point out the unique wholeness of the country, and to emphasize the fact that there is unity in diversity in our country. In spite of many regional and/or group differences, there is a common thread running in our ways of

living which is unique to our country. The point of unity should be brought out effectively by pointing out the many similarities in dealing with the differences of languages, religions, dresses, social customs etc. For example, most of the festivals in different parts of India are associated with agricultural cycle and change of seasons. Similarly, 'Dhoti' and 'Sari' are the popular dresses throughout the country.

i) Languages :

India is a multilingual country where as many as 179 languages, 544 dialects and 1952 mother tongues are spoken even though only 15 national languages are enlisted in the constitution.⁴ Although with the re-organisation of States on the linguistic basis, a certain amount of homogeneity has been achieved within the bounds of each state, still each of them contains linguistic minorities ranging from 2.22 per cent in Kerala to 63.53 percent in Bihar and 79.44 percent in Nagaland of their respective total populations.⁵

In other words each of the states in India represents in micro structure the similar diversity that India as a whole may be said to represent in a macro pattern. National Integration in a country as diverse as ours is possible only by mutual respect for each other's language.

ii) Religion :

India is a country of many religions, creeds and castes. These diversities have posed many problems for the essential unity of the country. However, our constitution based on secularism provides for freedom of worship and equality of all religions, creeds and castes in the eyes of the State. So there is a need to develop mutual tolerance of religions, respect for the religious beliefs of others and to understand the basic similarities in all religions.

iii) Food habits and Dresses :

The variations in climate and soil have resulted in varied production and availability of food products which have given different food habits in different parts of India. Religious customs also, to some extent, influence the food habits. Hence, geographic education ought to develop among pupils the understanding that food habits in different parts are essentially the products of natural environments. The pupils should also understand that persons having diffe-

4. Indla 1970

5. Ibid.

rent food habits have to be interdependent, as one part of the country which needs particular type of food may have to depend upon another part of the country which produces or supplies that type of food.

Like food habits, traditional dresses are also to a great extent influenced by climatic factors. Moreover, religious and social customs also in some cases influence traditional dresses. Therefore, in India we have great diversities in dresses in different parts.

iv) Attitude towards Regionalism ;

India being a vast country is divided into administrative units for reasons of convenience and better resource utilization. It should be emphasised that these artificial barriers are only for purpose of administration and nature does not recognize man-made barriers. For example, the Ganga does not flow through Uttar Pradesh alone, but also through Bihar and West Bengal. So an appreciation of inter-regional dependence is a much cherished goal of the teaching of geography, specially with a view to bring about better understanding between peoples of different regions. The immediate result of regional diversities may lead to the development of regional narrow mindedness, regional arrogance, and selfishness. Pupils should remember that the prosperity of a state should be viewed as an advantage to the whole country. Similarly, they should realize the futility of disputes between states over narrow issues.

v) Economic Imbalances :

Natural resources are neither uniformly distributed nor equally developed all over the country. Because of uneven distribution of population resulting in uneven distribution of markets, industries have concentrated only in certain parts of the country. Under such circumstances there are regional economic imbalances in our country. The pupils should understand that. While it is necessary to develop all the regions of the country economically as far as possible, there cannot be an equal degree of economic development of the different regions of the country. Consequently there has to be an inter-dependence for mutual benefit. That the gain to one state or region is a gain to the whole country, should be realised by the pupils.

D. Role of Geographic Education

a) Role of Schools :

The basic function of the schools is to prepare the society for a

change and to equip an individual with useful skills. The pupils in schools today become citizens of tomorrow. With proper education oriented towards national integration they can bring about a change in the society. The schools must, therefore, accept its share of responsibility in promoting national integration.

While teaching geography the teacher should always be cautious against projecting vague generalizations and images. He should also not indulge in over-emphasising the importance of one region and underplaying the importance of another. In imparting instructions in regional geography he should emphasise the fact that advancement or otherwise of any region has impact on other regions and the country as a whole.

b) Geography Curriculum

The cocurricular activities should be such that the pupils are brought together and made to work together. Planned excursions, inter-state Camps, Bharat Darshan tours and field trips should be introduced periodically for pupils for developing greater understanding of the diversities in their country.

Teaching of geography lends itself admirably to the development of national integration and the better appreciation of the life of people of the different parts of the country. While teaching this subject the teacher should emphasise the point such as the variety as a source of national strength, wholeness of the country, similarity in life and living, regional interdependence, richness of resources, wide distribution of job opportunities etc. The teacher should carefully avoid points like regional exclusiveness, regional self-sufficiency, regional prejudices and over-emphasis on political units.

CHAPTER II

National Integration and the Role of Geography

Nature of Geography

THE basic nature of geography has been well defined by James and Jones in the following words : Today, as in the past, geography is concerned with the arrangement of things on the face of the earth and with the associations of things that give character to particular places."¹

Its most widely accepted core lies in the concept of a real differentiation which holds that cultural diversities reflect the diversities of areas or places. Cholley has aptly remarked ; ' The object of geography is to know the earth in its total character, not in terms of individual categories of phenomena, physical, biological and human arranged in a series but rather in terms of combinations which create the different physical and human aspects which the surface of the earth reveals to us. It is an astonishing variety of aspects which this cover reveals to us : oceans, continents and overlying them, all the diversity of vegetational landscape, of systems of culture, forms of settlement and the organization of area by the human groups."² The same view has been expressed by the Glossary Committee of the British Geographers : "the science that describes the ' earth's surface with particular reference to differentiations and relationships of areas." Hartshorne has categorically stated : "Geography is

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1. James, P.E. and Jones, C.F. (Ed) ; "American Geography-Inventory and Prospect, Association of the American Geographers 1954, P.4
 2. Cholley, A3dre : "Gulde de l' Etudiant en Geographie" Paris, 1942 P. 14.

concerned to provide accurate, orderly and rational description and interpretation of the variable character of the earth's surface."³

However, all geographers do not share this view. Ullman considers "areal differentiation" as a sub-concept of geography as "spatial interaction."⁴ Recently Bunge⁵ has also challenged this traditional view and has asserted that the geography is concerned with what should be rather than what is. The following are four significant deviations from the traditional view-point :

(i) *Geography as the study of Landscape*

Some geographers like Schluter,⁶ Carl Sauer⁷ and P. W. Brayan⁸ have pleaded for geography as the study of landscape. They have divided landscape into two categories ; physical landscape and cultural landscape. They believe that this point of view will do away with certain "wooliness" associated with geography and give it concreteness of form and structure. However, the German word "Landschaft" whose English equivalent has been taken as "Landscape", is rather confusing because it has been used in different connotations. Apparently it should confine to the visible feature of a section of the earth, but it sometimes also includes the invisible aspects (social, political and religious too).

(ii) *Geography as the Science of Distribution :*

Some geographers hold the view that geography is essentially the science of distribution. This view was put forth more vigorously by Marthe who described geography as "the where of things". Other geographers like Herbertson in Britain, Sten de Geer in Sweden and Russell Smith in the U.S.A. have also stressed upon this viewpoint. "Just as Economics is centred about price, Geology about rocks, Botany about plants, Ethnology about race, History about time—so the pivotal point of Geography is place. When and why are

3. Hartshorne, Richard : "Perspective on the Nature of Geography" Chicago, 1959, P. 21.

4. Ullman, Edward L : "Human Geography and Area Research", A.A. G., 1954. Voll. XXXIV, p.60.

5. Bunge, W. "Theoretical Geography," Lund Series in Geography, Sweden, 1966.

6. Dickinson, R. E. "The Makers of Modern Geography", London, 1969, p. 126.

7. Sauer, Carl : "The Morphology of Landscape", University of California Publications, No. 2, 1925.

8. Brayan, P. W: "Man's Adaptation of Nature", London, 1933.

among the most persuasive questions to be answered while studying the real geography."⁹ Some would compare history and conclude : "If history is the science of the when, geography is the science of the where." No doubt the hall mark of all geographical writing is its concern for location and distribution and to many geography is really the "philosophy of place."

(iii) *Geography as a Science of Relationships :*

Many definitions in geography stress upon the relationship between the "the earth and man" or "man and the earth." Karl Ritter thought of their interaction and provided an anthropocentric viewpoint to geography. Ratzel elaborated it in his anthro-geo-geography in the light of the Darwinian theory of the "origin of species." However its popularity rested on the works of E.C. Sample in the U.S.A. and Blache in France. Later on H.H. Barrows made a plea for geography as Human Ecology and defined it as a science dealing with the mutual relationship between human groups and their physical environments. This viewpoint is most popular because the study of man and his environment is both interesting and useful. But it has bedevilled geography by the unending controversy of environmentalism (or determinism) and possibilism.

(iv) *Geography as a Spatial Theory :*

With the quantitative revolution which entered the field in the 1940's geography is seeking more and more the cooperation of new mathematics. Bunge, Berry,¹⁰ Chorley,¹¹ Haggett and Hagerstrand¹² and their followers stress upon the scientific content of geography and are engaged in framing theories, laws, models and paradigms. Their ultimate aim is to propound a set theory of spatial analysis. Hence they are trying to seek patterns and orders in the distribution of phenomena on the earth's surface. In fact, "much of the most exciting geographical work in the 1960's is emerging from applications of higher order geometrics, for example, the multi-dimensional geometry of Dacey's settlement and the graph theory and topology of Karsky's network analysis."

9. Smith, J. R. "Industrial and commercial Geography, New York, 1949, P.5.

10. Berry, Brian and Marble Duane (ed): "Spatial Analysis" Practice-Hall, 1968.

11. Chorley, R and Haggett, P,— "Models In Geography", London 1967.

12. Hagerstrand, T. . "Migration and Area", Lund studies in Geography, Series B, Human Geography, No. 13, Sweden, 1957.

In view of these deviations it is really difficult to define the circumference of geography, though its centre or focus is quite distinct. "Surely it is the spirit of the subject that just as many things vary on the earth's surface, so different environments, experiences and attitudes make for different emphasis in approach and content"¹³ It is sometimes lamently observed that 'Geography is what geographers do'. With the cross fertilization with other physical, biological, social and behavioural sciences new sub-fields are bound to develop at the periphery. It may necessitate new approaches and new techniques. In fact inter-disciplinary approach is often profitable in the fields of applied geography.

Geography has a wide compass. It deals with an astonishing variety of phenomena that characterise the complex of the geographical space. It seeks the common bond that unites them all and that makes them of the earth. Its object is to seek unity in diversity, hence it emphasizes the holistic view point. It stresses upon correlates, and not on isolates. The earth can be treated as an organic body whose organs and limbs may be studied separately by diverse disciplines, but their mathematical summation or pile would be different from the body that constitutes a functional system. Here lies the unique task of the geography whose synthesis of the terrestrial phenomena is something more than the sum of bits and pieces gathered from other disciplines. The geographer's task is not 'scissoring and pasting' or even super-editing the findings of other disciplines, he is to perceive and weave the wholeness of the geographical space that leads him to the concept of the terrestrial unity which is the highest thought in geography. It is his 'focussed curiosity' which makes him less of a narrow specialist and more of a man of broad vision.

Another fundamental principle of geography is that of activity or change. It implies that all the terrestrial phenomena, physical and human, are constantly changing. "Every technical advance and the use of resources or the discovery of new ones, every change in industrial or agricultural practices, every political upheaval brings in its train a new emphasis in geographical values often with a startling swiftness. The techniques of geography are employed in observing, recording and analysing the evidence of the changing world scene. The very substance of geography is constantly on the move"¹⁴ In this sense geography is contemporary and its teaching must be in

13. Cole J. P. and King, C.A.M. : *Quantitative Geography*, London, 1969, P. 14.

14. Gospill, G.H. : *'The teaching of Geography'*, New York 1966, p. 14.

keeping with its dynamic nature.

Now geographers also stress upon environmental perception which builds the behavioural environment.¹⁵ The teaching of geography should be so oriented that spatial patterns of behavioural environment are focussed upon. This will find support from their local and regional experience and promote better understanding and sense of participation.

Basic Approaches

(a) Systematic and Regional Geography

The field of geography includes the whole world which is an interacting unit as well as a mosaic of varied patterns of man-land relationships. Consequently it involves a vast sum of knowledge whose division is inevitable. That is why geography has been divided into two main branches : systematic and regional.

Systematic (or general or topical) geography studies the distribution pattern of a single element or a combination of elements, physical, biotic and social, on the earth's surface. In the realm of physical geography the spatial analysis of temperature or rainfall on the earth's surface provides an example of the first category, whereas that of a climatic type, say, the Mediterranean type of climate, characterized by a combination of temperature, rainfall, humidity, air pressure, wind direction and wind velocity, cloudiness, and other elements, is the example of the second category. In human geography the global patterns of population, urbanization and economic development, etc., may be listed as examples of systematic studies.

Regional geography deals with the totality of the interacting elements, physical, biotic and social, in an individual area of the earth's surface. It has sometimes been called the core of geography. In the words of Prof. Pye : "Geography maintains the needs for looking at things as a whole, and it is in his regional method that the geographer makes his unique contribution to learning." Balchin also observes , "The attempt to give a total explanation of the complex relationships in any one physical and human environment is quite unique to geography, and its practice calls for a breadth and depth of knowledge rarely found in the academic world."¹⁶

15. Board, C., Chorley, R.J., Haggett, P. and Stoddart, D.R. : "Progress in Geography", Vol. I, London, 1969, p. p. 22-23

16. Balchin, W.G.V. (Ed.) : "Geography—An outline for the Intending Student", London, 1970, P. 6.

A region is defined by its over-all homogeneity or similarity in terms of a specific criteria, say, a physiographic region or a climatic region or a vegetation region, or an agricultural region, or an industrial region or a cultural region, etc. There are two types of regions : generic or formal regions which represent the spatial expression of a particular element of the environment, physical, biotic or social; and functional regions which express the functional organization of space, say, an economic region or an umland. In view of the growing importance of regional planning the functional regions are acquiring an increasing significance.

However, it should be made clear that the duality of systematic geography and regional geography is rather unreal. In view of the essential unity of the discipline they are really complementary to each other. Berry¹⁷, has observed that systematic and regional geography are not different approaches, but are just the two extremes of a continuum, and has demonstrated their logical inter-connections. Morgan and Moss¹⁸ stress upon areal analysis rather than regional synthesis.

(b) *Determinism and Possibilism*

There is no gain saying the fact that there are associations and spatial interactions between physical environment and man. But the debating question is in what ways and to what degree does physical environment influence man. This has led to the dualism of determinism and possibilism which has dominated the geographic philosophy for over a century. In fact, determinism or environmentalism stresses upon the influence of physical environment on man, whereas possibilism emphasizes the freedom of human choice and the impact of human activity on physical environment.

Since the days of classical antiquity geographers have been stressing upon the influence of physical factors of the environment on human society. Wherever they came across some unusual social phenomena, they would seek its explanation in one or the other factor of the physical environment, say, climate, soil, relief features, etc. With limited data at their disposal they advanced pragmatic generalisations and tried to demonstrate that "society is fashioned by environment." Leplay propounded the dictum

17 Berry, B J L. "Approaches to Regional Analysis", *Annals of the Association of American Geographers*, Vol. 54, March 1964, P. 2

18. Morgan, W.B. and Moss, R.P., 'Geography and Ecology, *Annals of the Association of American Geographers*, Vol. 55, 1965, p.1.

of "place-work-folk." E.C. Sample in her book 'Influences of Geographic Environment' asserted : "Man is a product of the earth's surface. This means not only that he is a child of the earth, dust of her dust but that the earth has mothered him, fed him, got him tasks, directed his thoughts, confronted him with difficulties that have strengthened his body and sharpened his wits, gave him his problems of irrigation and navigation and at the same time whispered hints for their solution"¹⁹.

With the advancement of knowledge about the earth and man such crude determinism could no more hold water. It was bitterly criticised by the possibilist school which raised the human activity to one of the powers of nature and stressed on human choice. In the words of Febre : "there are no necessities but everywhere possibilities and man as a master of these possibilities is the judge of their uses."²⁰ The possibilist without denying the limits imposed by physical environment stresses upon effective human choice.

However, determinism did not die out. It reassented itself as Neo-determinism, which stressed upon the scientific study of the influence of physical environment and like Prof G. Taylor asserted : "Stop-and-go-Determinism."

Now many geographers feel that "the over-riding problem of geography is the understanding of the vast system on the earth comprising man and the natural environment." The quantitative revolution has further necessitated the deterministic approach which has been called 'probabilism' by spate²¹. "The geographer's concern with environmental determinism is just one aspect of a much wider problem. Man is meritably influenced by his environment but nowhere completely and nowhere is he entirely free. There can be no argument whether man is determined or not. The geographer among other things can evaluate only the degree to which the physical features have a direct effect on man's activities."²²

19. Sample, E.C., "Influences of Geographic Environment", New York (London), 1911, P. 2.

20. Febre, L., "A Geographical Introduction to History", London, 1925, P. 63.

21. Spate, O.H.K., "Toynbee and Huntington : A Study of Determinism", Geographical Journal, Vol. CXVIII, 1952.

22. Minshull, Roger, "The changing Nature of Geography ; London, 1970, PP. 116-17.

According to Lowthwaite "determinism and possibilism are the two ends of the spectrum, not contractions, and several other models can be set up at stages along the spectrum to generalise about the working of environmental determinism of different times, at different places, on different people."²³ The appropriate query to be placed against a conclusion is not "is this possibilism" ? or "is this determinism" ? but "is this true ?"²⁴

Major objectives of the Teaching of geography

The teaching of geography can help in developing right attitudes. A 'geographical outlook' means a right way of looking at the problem. The geographer is to view the issues in their correct perspective. He is to be guided by reason rather than passion. It is this very spirit that dominates a Norwegian novel captioned "Geography and love". Its hero is a professor of geography who believes : 'Geography won't do without love' but at last he comes to the conclusion "All love and no geography won't do either."

The teaching of geography should be made interesting with practical exposure to the problems. It should provide the challenge to the problems and help in their solutions. It should be so exciting and absorbing as to bring into play mental aptitudes of the children, invoke their powers of observation, reasoning and imagination. "To sum up, the teaching of geography should be directed to awakening *geographical curiosity*, whilst at the same time speaking the ultimate objective which is the inculcation of a geographical spirit in harmony with the pupils' general training."²⁵

The Role of Geographic Teaching in Fostering National Integration

India is a vast country and has an astonishing variety of physical and cultural features. However, there is an underlying unity, physical as well as cultural, that provides the bed-rock for cementing the superficial diversity and encourages her people to think of their proud cultural heritage and richness of resources. Geography teaching emphasises this approach which is the *summa bonum*

23. Minshull, Roger, *op.cit.*, p. 114.

24. Lowthwaite, G.R., "Environmentalism and Determinism a search for clarification", *Annals of the Association of American Geographers*, Vol. 56, 1966, P.I.

25. *Source Book for Geography teaching* : UNESCO, Longmans, 1955, p.3.

of national integration. Geography deals with likenesses and differences of the various parts of the country and presents a correct perspective in which physical, economic, social and cultural differences weave into colourful patterns in the national panorama. Hence, geography teaching has relevance to national integration which can be achieved by developing the following attitudes among the pupils.

(a) A Constructive approach to differences

A reference has already been made to the remarkable areal diversity of India. Perhaps it is forgotten that for natural balance the heterogeneity and variety is essential. This latitudinal extent of the country as well as its altitudinal heterogeneity have added much to its physico-biotic co-working system. Even a phenomenon like the monsoon is a product of such a heterogeneous complex—the contrasting nature of the landmass girdled by the mountain wall on the north and oceanic expanse in the south.

Another viewpoint with regard to differences relates to their richness of resources. India's richness in biotic and mineral resources owes to the diversity of physical and geological conditions. The variety of field crops as well as forests types owes to the variety of relief, climate and soils.

"Bharat includes simultaneously the historic-territorial concepts in terms of the Dravidian and Aryan cultures which, though diverse in origin, could fuse together with the Hindu culture in its geographical realms since fifty centuries. The culture and national integration is reflected in the location of the four Dharmas (Holy places)—Rameshwaram in the South, Badri-Kedar in the North, Puri in the East and Dwarka in the West, these being the cultural centres in the four cardinal directions within the dimension of the country. The visit to these centres was considered to be significant in one's life even in remote times when inaccessibility threatened movement. Varanasi served as a crucible for fusion and crystallisation of the diverse cultures of India"²⁶

(b) A sense of National Integrity

The teaching of geography should demonstrate that India is an integral entity, and not just an agglomeration of assorted regional units. The regional diversity should be subservient to the national

²⁶ Singh, R.L. (Ed) : "India - A Regional Geography", National Geographical Society of India, Varanasi, 1971, p 2.

unity, hence the total image of the country should be projected and its national integrity stressed upon. The students should be made aware of the dangers of 'Balkanisation'. The partition of the country into India and Pakistan and the attendant problems can be cited for illustrating the dangers of 'Balkanisation' and secession. India's existence as a nation and as a world power depends upon its national integrity which provides the basis for economic and social progress. It calls for national solidarity and patriotism.

(c) A sense of interdependence and cooperation

The students should be made to appreciate a sense of interdependence among different states and peoples of India. An understanding should be developed that the country's socio-economic progress depends upon the cooperation of all regions and all people, of India irrespective of caste, creed, and colour. The progress of a particular region or a particular community is no sheet anchor of the national achievement. In fact efforts are urgently needed for a balanced development of every part and every community of the country.

(d) A sense of open mindedness

Geography by its very nature stands for objective approach to problems : It preaches openmindedness and liberates the pupil's mind from narrow considerations and prejudices. The different ways of life and living in different regions of the country can be appreciated in the light of environmental perception and human adaptation. This point of view can invoke their deep seated sympathies and open-mindedness for other social groups living in the far-off corners of the country.

(e) Identification of the problems and their solution

The pupils should identify the relevant problems concerning the country and think about their solutions. For example, there are boundary problems between various states of the country. They have often befogged national unity and have whipped up regional consciousness. Such attitudes must be curbed rather nipped in the bud. After all, India is a nation and the states are its parts. National integrity and patriotism demand that such issues should be settled amicably by a competent authority whose objective judgment

should be accepted and respected by all concerned. Any minor change in administrative boundaries should not lead to a bitterness. Similarly the valley projects which cover more than one state, have often led to bitterness between neighbouring states who forget their importance as regional bonds. This approach of students of geography to such problems is indeed conducive to national integration.

CHAPTER III

Teaching of School Geography

Some Desirable Emphases

PART I

General Considerations

The subject matter of geography holds great potentiality for promoting the feeling of national oneness and weakening of such regional loyalties as work against the interests of the nation. The content of the instructional material in geography has certain important characteristics which must be stressed upon if the subject is to be fully utilised for the task of fostering the feeling of national integration among pupils. These characteristics¹ may be briefly stated as follows ;

- (a) The interaction between man and environment.
- (b) Geography as a science dealing with spatial distribution.
- (c) The concept of "wholeness" emphasized in geography.
- (d) The need for the projection or interpolation of the subject from the present to the future as well as the past, which is called the dynamism of geography.

Again, the potentialities in instruction may be used in two ways :—

- (a) For strengthening the feeling of "national oneness".
- (b) For weakening the stranglehold of "regional loyalties".

1. For more details see 'The Nation and the School' by NCERT chapter five.

With the above potentialities in view some of the principal aims of teaching school geography should be :

- (a) Promotion of accurate and reasoned thinking among pupils.
- (b) Appreciation of interdependence of different regions.
- (c) Development of a sense of pride in our country's resources and of confidence regarding the country's capacity to grow into a strong economic and political power.
- (d) To promote perception of the country as a "whole", with interest of the country rising above local interests.

Our main task thus lies in considering the basic issues to the gearing of geography instruction to the need for strengthening the feeling of national integration

It is vitally important that the teacher of geography should clearly emphasize certain points (desirable emphases), and avoid or tone down certain other points (undersirable emphases), if the subject has to be viewed in proper perspective so that the feeling of 'national oneness' is fostered in our pupils. The teacher must be very clear in his mind regarding these favourable or unfavourable emphases.

Points to be Emphasised (Desirable Emphases)

While teaching any topic from the prescribed syllabus, the following points should be emphasized :

- (1) Variety as a source of national strength.
- (2) Oneness of the country.
- (3) Discovering "Indianness" by observing similarities in life and living in the various regions of the country and by emphasising the commonness of destiny.
- (4) Regional interdependence and the need for mutual cooperation.
- (5) Richness of resources as a potential for emergence of the country as a great economic and political power.
- (6) Accent on progressive measures to curb narrow group loyalties.
- (7) Accent on the need for inter-state mobility of young men within the country as a result of the wide distribution of job opportunities.

Points to be Avoided (Undersirable Emphases)

Perhaps much more important than desuable emphases are the points which must be avoided or toned down (Undersirable emphases), for they can undo much of the good work done by the teacher and cause serious harm by promoting anti-national feelings.

Some of the points which must be avoided or toned down are :—

- (1) Over emphasis on regional exclusiveness and regional self-sufficiency which may not be in the interests of the nation as a whole.
- (2) Regional prejudices.
- (3) Regional isolation.
- (4) Over-emphasis on political units.
- (5) Facile generalisations.

The teacher's role is more of a guide and a friend rather than of a mere giver of factual knowledge. As far as possible he should adopt a problem-solving approach so that pupils understand geography in functional terms. He should aim at promoting reasoned and accurate thinking among his pupils.

PART B

Desirable Emphases in the Subject Matter of Geography

As a specimen, geography syllabus of the Higher Secondary Examination conducted by the Central Board of Secondary Education, New Delhi has been taken up for study with a view to analyse what desirable emphases may be stressed upon in order to foster national integration and what pitfalls have to be avoided. Topic-wise study has been undertaken in order to indicate the bearing on the problem of national integration. This exercise should be undertaken by curricular framers and teachers in respect of their own curriculum plans.

I Geography of India

Topic No. 1—Location and size of India :

This topic is generally helpful in developing the feeling of national integration. Emphasis ought to be laid on the unique location of the whole Indian sub-continent at the head of the Indian Ocean. The Deccan Peninsula jutting out into the ocean has added the advant-

age of a long coast line. Locational advantage of the high mountain wall may also be highlighted.

The size of the country with a rich interior may also be stressed upon.

Topic No. 2—Relief and Drainage :

This topic, though helpful in promoting national integration, may create problems unless handled carefully. Some such problems are as follows :

- i. The importance of certain relief regions or river basins may be overemphasized giving rise to regional exclusiveness. This ought to be toned down by referring to the contribution of each region in the development of others for the benefit of all.
- ii. Shifting of river courses near State boundaries may affect village sites giving rise to inter-state conflicts. This again has to be understood on all-India basis.

In this way regional exclusiveness and isolation must be toned down by referring to the fact that variety of relief is a source of strength to the country because it helps in the production of various types of crops and vegetation. The longitudinal stretch of the Himalayas and the northern plain should also be made use of in order to explain nature's plan for making the whole sub-continent as one

Topic No. 3—Climate

This topic may be utilized to explain that India has one type of climate i.e. the monsoon climate, although difference of distance and/or relief result in diversities by way of sub-types of climate. The existence of such diversities explain why people of India differ in food habits, dresses, customs etc. from one region to other.

- Topic No. 4—Natural Vegetation :

Emphasis may be laid on the following points :—

1. There is a great variety of natural vegetation in India which is a source of strength to the country.
2. Interdependence of various regions with regard to products of natural vegetation has to be highlighted.
3. Richness of these resources as a potentiality to become a great nation may be stressed upon.

Topic No. 5—Soils :

While dealing with this topic the following points which are

important from the standpoint of the whole country may be stressed upon :

- 1 There is a great variety of soil groups in India which have contributed to the variety and richness of crops in the country. Some of the notable examples are :
 - a) fertile alluvial soils in the Delta region of the Ganga are devoted to jute production also—a commodity on which the jute industry of India is flourishing.
 - b) black soil group in the Deccan plateau is important for growing most of India's cotton crop which feeds the textile industry of India
 - c) Coastal sandy soils are famous for the production of coconuts
- 2 Concentration of population in India is notable in the fertile alluvial soils.
3. New technology and use of fertilisers has led to the utilisation of less fertile soils for the higher production of crops and to the opening up of new frontiers in crop production.
4. Extensions of irrigation facilities has facilitated better utilisation of long neglected soils in desert regions.
5. National efforts have succeeded to reclaim soils till now lost to agriculture.

Topic No. 6—Irrigation and multipurpose River Valley Projects :

It is possible that certain problems may crop up in handling this topic. Region-wise description of the topic may lead to such problems as regional exclusiveness, regional self-sufficiency, bias in job selections, and imbalance in exploitation of resources. Consequently, there is a need for well-coordinated efforts on an all-India basis. Emphasis ought to be laid on this aspect.

Topic No. 7—Agricultural Products :

Once again, the emphasis should be laid on richness of agricultural resources, regional interdependence, and variety as a source of national strength. Examples of regional interdependence are as follows :

- (i) Cash crops are a source of benefit to the whole country.
- (ii) In many cases pulses, cereals, and oilseeds have to be transported from one state to other state.
- (iii) Beverages are consumed all over the country, but are produced in limited areas.
- (iv) Spices produced in some areas are used all over the country.

Topic No. 8—Mineral Wealth :

Since occurrence of mineral wealth is mostly concentrated in specific areas, there is always a danger that students may develop a sense of regional arrogance. While dealing with this topic, emphasis ought to be laid on regional interdependence. There are also problems of imbalance in the exploitation of the mineral resources or of a bias in job selections etc. In such cases stress should be laid on the need for the well co-ordinated efforts on an all-India basis. In order to develop national integration, emphasis must be laid on the richness of our mineral resources as a potential for developing our country as a whole.

Topic No. 9—Location and Distribution of Industries :

Location of industries has often led to inter-state rivalries. Fantastic demands have often been made for the establishment of industries at centres where conditions do not permit optimum production. Emphasis should be laid on regional interdependence in the movement of raw materials and finished products and on the all India selection of skilled labour. The role of manufacturing industries towards economic development of the nation as a whole should also be emphasised.

Topic No 10—Means of Transport :

The topic though helpful in developing the feeling of national unity may create inter-state invidious comparisons which may just be due to difference in the phasing of development in transport facilities in the various regions. Reasons behind certain areas being well served by lines of communication should, therefore, be dealt with carefully. The following points must be properly emphasized :—

- (i) Exact type of transport system depends on the physical environment and economic development of the area concerned.
- (ii) National highways and the trunk railway routes serve as country-wide arteries of economic and cultural life.
- (iii) Inter-state cooperation for the development of inland waterways has great possibilities over a large part of our country.
- (iv) Movement of men and ideas to distant places ushers in a well-knit culture and a well-integrated society.

Topic No. 11—Distribution of Population :

The population of our country shows a wide variety in terms of physiognomy, cultural life, settlement, and density. These differences

should be suitably explained and exploited as points of national assets. This should be done by stressing upon such understandings as the following :

- (i) Racial variety in the country has resulted in the development of tolerance and mutual regard for each other in Indian people.
- (ii) Wide mixing of people having different cultural backgrounds has made our countrymen very adaptable - a fact which is borne out by the success of Indians as emigrants in any part of the world. -
- (iii) It is desirable to utilize labour force from densely populated areas for developing such relatively vacant lands as Assam, Rajasthan and Himalayan region.
- (iv) There is a need for controlling population growth all over the country but more drastically in certain areas.

Topic No. 12—Towns and Ports

This topic may also generate rivalries, such as the following .

- (i) Rural—urban rivalries
- (ii) Rivalries between well-developed areas and the slums, and
- (iii) Rivalries for ports, sites and their development priorities.

In order to avoid adverse influence of such conflicting situations it will be advisable to emphasize the following points .

- (a) There is always an interdependence - a kind of symbiosis between rural and urban areas. This ought to be highlighted.
- (b) Slums develop owing to overcrowding in cities. India in trying to develop at a fast speed is not able to avoid it in as much as it could be possible
- (c) Cities and ports are national assets and are not exclusive to any region. Customs, income taxes, etc. earned here largely go to the centre and this will benefit the nation as a whole.
- (d) Big metropolitan cities must be so administered that they may maintain their all-India character and the minority groups may not have to suffer.

II General Physical and economic Geography of the World

With the exception of climatic and vegetational types, the general

physical geography has little bearing to the problem of national integration.

Topic No. 13—Climate and Vegetational Types of the World

This topic is helpful in developing a feeling that though the environmental conditions are different, yet they are complementary of each other. As such, people, inhabiting these differing climatic and biotic environments, should also cooperate with each other and profit from such relationship. It means that regional interdependence must be emphasized. The lessons learnt from the regional interdependence between the various regions of the world can be applied to our own country.

Topic No. 14—General Economic Geography of the World.

This topic is helpful in extending the feeling of national integration to international understanding. Pupils must be made aware of the fact that beverages such as tea, coffee etc. are grown in a few areas only but are consumed by people all over the world. Similarly, cotton, jute, Sugarcane and such other agricultural products are sent from one part to other parts. Mineral products and industrial products are also important commodities of inter-regional movement.

The concept of regional interdependence and the inter-region movement of raw materials and finished products must be highlighted. In this connection India's environmental advantages in producing tea, Jute, and sugarcane and the economic needs and products of other countries must be fully discussed.

While dealing with this topic it will be useful to develop a sense of urgency about the development of underdeveloped countries in our pupils so that they may understand the ills of inequality wherever it exists. They ought to be made committed to overcome the gap between the developing and developed countries which still continues.

Topic No. 15—Geography of Neighbouring Lands

Countries taught under this topic are :

1. Ceylon, 2. Burma, 3. Malaysia, 4. Afghanistan 5. Nepal-
6. Egypt, 7. Kenya, 8. Pakistan, and 9. Bangladesh.

It should be suitably stressed that India maintains close trade and cultural relationships with its neighbouring countries. Each of these

countries should be politically stable and prosperous to ensure peace and good-will among neighbours

III Practical Geography

Topic No. 16—Practical Geography & Mapwork:

The topic has no conceptual bearing on the theme of national integration, but has great instrumental significance. The skills may be suitably exploited to draw maps and diagrams which support the feeling of national oneness and understanding.

Conclusion

The content material of Geography is such that it can develop an understanding how human beings are one but how environmental differences make them live differently. But the way of teaching the subject may lead to erroneous conclusions. Consequently, it has been hinted in part (a) of this chapter as to what the desirable and undesirable emphases are. Part (b) of the chapter tries to investigate the points within the topics taught in higher secondary classes which need to be emphasised or avoided.

CHAPTER IV

Some Issues in Teaching Practices of Geography

Introduction

Content of geography is, by and large, taken to be an innocuous medium in so far as the danger of breeding undesirable attitudes particularly a sense of national apathy or antipathy is concerned. This is perhaps so because what is taught as geography at the school stage is primarily concerned with the study of physical environment and economic development over the country or the world or part thereof. Since this study is in the context of the present, one cannot always afford to look at the things with jaundiced eyes and get away with it leniently, as is often the case with historical materials. For example, the 'Monsoon' does not make any particular distinction between different communities living in the country nor between regions within it out of a sheer malicious design. If any one shuts his eyes to the realities of the 'Monsoon', he will do it at his own peril. Bursting advancement, retreating and 'dying' of 'Monsoon' govern the sowing, growing and harvesting of crop all over the country. Our fairs and festivals too are season oriented; in a way they follow the discipline of the 'Monsoon'. One can ignore or distort an age-old cultural tradition but cannot afford to do the same with facts of geography so easily.

Nevertheless, it is not all a very smooth sailing with geographic instructions; it does create problems which undoubtedly lead to inculcation of unhealthy thinking and feelings which run counter to the ideals of national cohesiveness. There may not be many

instances of this nature, which could be picked out of the prescriptions in the syllabuses directly, but there are of course, many a serious matter which may not be missed by a discerning mind while watching class room teaching. The situation can be revealed through an assessment of pupil's attitudes and tracing back their sources. It is true that textbooks and other instructional materials also suffer from many a demerit on this ground but it can hardly be denied that inadequacies at the level of instructional practices remain the prime source of undesirable attitudes developed through wrong geographic education. Broadly speaking, it happens as follows :

The teacher talks and directs, and the pupil listens and acts. This kind of passive behaviour of the learner is conducive to easy passing on of the teacher's prejudices both through the acts of omission and commission. Therefore, there is need for giving the learner an opportunity to think critically. This requires adoption of practices which provide active participation of the learner in the teaching learning process. His participation should be backed by the use of methods of geographic inquiry, of course at his level, for which there is undoubtedly an ample scope. The conventional teacher often objects to these methods on the plea of either children's lack of educability or paucity of time available to him for class-room instruction. On a close examination none of these appears to be a valid excuse. This will be evident from the discussion that follows.

The tendency to over-generalize and even to over-simplify facts, trends and arguments in geography often finds favour under the wrong notion that by doing so the instructional matter is brought down to the learner's level of comprehension. The reality is otherwise, for this may only help him to memorize with less effort but without proper understanding, it being less in verbal volume. In fact, it creates a problem for the learner because facts or generalizations learnt without proper understanding or context merely stick in memory at a non-operational level. Confusion and mis-conception so acquired become a permanent liability to the psyche of a well-meaning but uncritical learner. Examples are many. There are persons who wrongly take the Ganga primarily to be a river of Uttar Pradesh, so much so that in a well known school text book of geography, inhabitants of Uttar Pradesh were described as Ganga-Putra as different from those of Bihar or West Bengal. As a matter of fact a large percentage of the people of Uttar Pradesh may not find so easy to visit the Ganga as the persons living in the other two

States. Truly speaking, the Ganga is held equally in high respect by the people of the entire country. Similarly one may come across statements like 'Monsoon strikes mountains to burst into rain', 'it begins in July', 'cotton is largely cultivated on the Lava Plateau of Maharashtra', 'Assam is mostly inhabited by tribal people (They constituted only 20% of the total population of the erstwhile Assam in 1961), Bihar is an industrial State', 'Punjab is an agricultural State', etc. How dangerous indeed, it is to feed young minds on such facile generalization and over simplification of facts !

Integration Through Self-Experience

Often we find that a young pupil operating the second-hand reasoning along, fails to internalize learning, the implications being too remote or too complex to be grasped by him. The task is made still more difficult where he is unaware of the process involved in reaching a certain generalization, inference, prediction or a value judgment. Some of these processes in geography learning may involve collecting of data, analysing and synthesizing the information, applying it to the hypothesis in hand and finally coming to some judgment. Attitudes bred on the bedrock of inadequate knowledge and its proper application, run the risk of being erroneous, partial and superficial. Needless to emphasize that the learning takes place through interaction of new knowledge with the previous experience of the learner and as such the experience provided by the teacher is only to assist this process. Hence, the importance of self-experience in learning is obvious. Taking cue from this it may be observed that a proper feeling of national and emotional integration can grow when the learner becomes aware of it through his own reason. To put it briefly, the teaching of geography should become less and less teacher-oriented. A hypothesis or generalization whenever advanced by the teacher with a view to economising learning effort should be critically looked into by his students when they may select or reject, favour or disfavour, and finally come to their own judgment about its validity, of course, through the active guidance of the teacher.

The pupils will not be able to participate in such an 'inquiry model' of teaching, unless they are prepared for it. It will, therefore, be necessary to arrange for formal training in such a participation, almost in the same manner as a sports coach proceeds. There may be a need of some kind of a demonstration of the process. An illustration would make this clear.

Our pupils learn the geography of villages and towns i.e. about their sites, functions and relationships. One way is to take up this in the class-room in the form of a lecture or some discussion. The other may be to give pupils a problem and then to guide them to collect data, visit places and come to conclusions much the same way as a professional geographer does. Proceeding either way but achieving the best results ought to be the teacher's aim. However, by adopting the second way the teacher of geography can exploit this topic towards fostering the spirit of national cohesiveness and building a sense of belongingness to the country among his pupils.

Village population is generally comprised of people of various classes in terms of religion, as also, economic and social status, but this variegated rural demographic pattern evinces one whole system - a gestalt which may be called the rural system. The rural system and the interactions within it compel people to form various kinds of groups, such as classes, professions, creeds etc. to function for the achievement of a common goal i.e. smooth and happy life in the village community. Extending the frontiers of rural system we have a rural area comprising of a number of similar rural systems with the rural market or 'Mandi' serving as its nucleus. This bigger system, in its turn, again merges to form another, a still larger system, which goes on finally ending up with the country as a whole.

The people living in the villages form a socio economic system but this system should not by itself be fully self-sustaining, especially with fast developing economy. They are compelled to purchase from others and sell their own products, thus entering into a relationship in which a series of interactions take place. These interactions take a variety of forms - economic, educational, medical, judicial, cultural etc. In this way the inter-dependence between one community and the other, between one village and the other, between villages and towns, between towns and metropolises and one region and another becomes explicit. If properly visualized, this feeling of interdependence should strike at the root of the prejudices of regionalism, linguism or religious intolerance.

It is true that the form is important in the teaching of geography but it cannot in any way ignore the role of the process which should get due recognition with a view to helping students see the implications in terms of functions and the progress of these functions in terms of processes involved. This can become possible only when a learner is led into the process of discovering the details himself.

Some Methods of Study

Teachers of geography are used to a few sets of conventional techniques of teaching like questioning, lecturing, explanatory discussions in groups, map filling, map-study, etc. These are good in themselves if employed judiciously, but something more has to be done because of expanding knowledge, newer technology and emergence of new social and political values. As such, the role of the teacher is becoming more and more important but less and less dominant. Hence, it will be advisable for a teacher to re-orient his instructional methods and techniques. An opportunity is taken here to discuss in brief some important methods and techniques which may be helpful under the new conditions. There are—

- (a) Field Study,
- (b) Sample Study,
- (c) Simulation, and
- (d) Project work

Field Study

(a) *What is Field Study ?*

In Geography we generally study phenomena at their point of occurrence. Therefore, field becomes a sort of laboratory for a student of geography. He draws conclusions by observing the phenomena himself. Field work includes three basic steps viz (i) a visit or excursion to have a first-hand experience of the phenomena, landscapes and distributions; (ii) investigation into a specific problem or problems through use of various techniques of observing and recording data including collection of documentary evidence in the field ; and (iii) analysis of the data with a view to testing a hypothesis and drawing out inferences.)

(b) *Procedure Employed*

A field-study requires adequate preparation before the visit and a plan to follow it up. This involves such things as selection of maps of the area, drawing of some appropriate maps and sketches, revision of the existing maps if necessary, finalization of questionnaire or schedule as per problem to be investigated, collection and analyses of data together with the drawing of maps on their basis, and lastly to arrive at conclusions about or solution of the problem. (For detailed structuring of the Field work see Appendix I.)

(c) Some Special Areas for Field Studies

It may not be feasible to undertake field studies frequently, the purpose being mainly to give pupils training in practising geographical methods and in special cases to observe the phenomena in original to guard against mis-conceptions. With these needs in view the course of study should be carefully examined and some functional units in which Field Studies can be undertaken with profit, may be identified. Given below is a statement in which a course of study prescribed for the Higher Secondary Stage has been scrutinized and some units have been identified providing occasions for field study in the particular context of national integration.

<i>Topics</i>	<i>Desirable Units</i>	<i>Some of the suggested areas of the field study.</i>
1. Location and size of India	Where are you ?	Locality and its neighbourhood.
2. Relief and drainage	Topographic Know-how.	1. Soil achievements. 2. From ground to toposheet and from toposheet to ground.
3. Climate	Monsoon	1. Our seasons and fairs and festivals. 2. You as a farmer and the monsoon.
4. Natural vegetation	Our forest wealth.	1. Make friendship with trees, plants, bushes, etc. 2. 'Vanmahotsava'.
5. Soil	Soils and sowers	Soil and crops.
6. Minerals	Our Mineral Wealth.	1. School-building, our houses, etc. 2. Any Industrial Establishment.
7. Irrigation and Multipurpose Projects.	Modern temples of India	1. Water-supply and farming. 2. A visit to a multi-

		purpose project. (A week's duration) ; distribution and benefits.
8. Agriculture and Agricultural products.	Farmers and Farming	<ol style="list-style-type: none"> 1. Our diet — where do we get our materials from ? 2. Farm study—Inputs and outputs ; their success and destination. 3. Our cash crops. 4. Village study (To be combined with sample study of other parts of the country.)
9. Industries and Location of industries.	Our manufactured goods.	Biography of any manufactured item of daily uses.
10. Transport	Means and modes of Transport.	<ol style="list-style-type: none"> 1. Story of circulation. 2. Life-lines of India. (Inter-state integration).
11. Population.	Where and how many ?	<ol style="list-style-type: none"> 1. Village demography. 2. Family planning (over-population and its solution. 3. A visit to a district Census office.
12. Towns and ports.	Know your India.	<ol style="list-style-type: none"> 1. Our cultural centres. 2. Gate-ways of India.
13. Trade and Commerce.	Give and Take	<ol style="list-style-type: none"> 1. Visit to a rural market. 2. A visit to a trade centre. 3. A plea for give and take (An inter-state study).

A Sample Plan Field Study

The Study of a Village

The study of a village provides sufficient ground to understand the nature of environmental and social change taking place in the country resulting from various development schemes. This is likely to foster a sense of oneness specially among the urban population. The results of field studies from various parts of the country can give an idea about the variety of physical, and cultural landscapes in the country.

(a) Preparation :

Locate the village under study in one inch Survey sheet and prepare a plan for the visit under the following special heads (Where Survey sheet is not available the Tehsil or Taluka map may be consulted. It is even better to consult both) :

(i) Distance from the starting point (ii) Nature of route (a rough sketch of the route may be drawn : (iii) Available means of transport; (iv) Decision about the means of transport to be used, (v) Appropriate timetable for the field work ; (vi) Board and lodging arrangements ; (vii) Articles to be carried.

A detailed list of things to be carried with.

- (i) Topographical sheets on different scales showing the location of the map under study : sheets on the scale of 1" and 1½").
- (ii) Settlement/cadasral maps including the settlement map of the village concerned and also of the villages adjacent to it.
- (iii) Drawing materials such as paper, pencil, rubber etc.
- (iv) Cyclostyled copies of maps including outlines to be used by individuals or groups of pupils for filling details.
- (v) Questionnaire sheets and other proforma.

(b) Objectives of Field Studies : The Hypotheses

(i) The villages meet some of our basic requirements of food, clothing and shelter (ii) The village under study feeds neighbouring urban centre with some of the important articles of daily necessity. (iii) The village has close association with the 'Mandies' where the villagers dispose off their products. (iv) 'Mandi-town' caters to the requirements of the villagers e.g. essential services through the institutions such as financial, medical, education etc. and also through the marketing of manufactured products. (v) A sample village is a part of a system which comprises of a local mandi-town, the district head-quarter town and ultimately the whole country (vi) Rural urban

sybiosis is more a functional reality than anything structured by biases, such as regional, linguistic or religious.

(c) *The information needed to test the above hypotheses and its treatment.*

- (i) This to be collected by the groups of students moving out from the villages to the neighbouring mandi-town and vice versa. (See village study questionnaire in appendix 3)
- (ii) Diagrams, charts, maps and matrices are to be prepared on the basis of information so collected (See appendix 2).
- (iii) The information along with the diagrams, maps, etc is processed, rechecked analysed and synthesised.
- (iv) Inferences are drawn to reject or accept the hypotheses
- (v) A final report is prepared.

Sample Study

Ours is a very large country which offers a very large environmental variety. There is quite a large number of administrative units by way of States and Union Territories and within them divisions, districts, etc. These administrative units differ among themselves in respect of relief, climate, natural resources, settlement patterns and the like. On a sample scale, areal differentiation percolates to the smallest areal unit and it can be admitted that no two places on the earth resemble each other in all aspects. When studying a large unit, the differentiation at the level of smaller unit may be taken to represent in same way as the differences between the larger units. Working on this analogy Indianness is present even in the minutest part of the country though it may not be comprehensive enough to cover all the aspects of Indianness. Since it is not possible to observe a phenomenon all over a large unit it becomes practical to choose smaller unit to study it in detail and discover its characteristics. In order to do so representative units may be called representative samples. To study the samples closely with a view to arriving at inferences with regard to the larger unit is what is known as sample study method. Sample study is, thus, a study of smaller representation of a larger whole.

Suppose we want to test a hypothesis that 'the pilgrimage in India attracts people from all over the country without any regional bias'. This requires a study of all the centres, of pilgrimage in the country which is very expensive, time consuming, and difficult in many other

ways. It would be wise to select some representative places of pilgrimage in the four corners of the country, say half a dozen, and organise field trips to these places to observe the phenomenon. Some other technique of sampling can also be tried. On the basis of such study inferences can be drawn for the whole country and places of pilgrimage in general.

There is yet another occasion for employing this method. Pupils are generally fed on broad and sweeping generalisations about regions their economic development, settlement patterns, and other aspects of physical and cultural landscape. After choosing a few representative samples from the region, they can be studied in detail to bring home the reality behind the generalizations. The size of the sample will depend on the purpose and the class level. For example, a sample study of a Wheat Farm near Ludhiana, Ferozepur and Amritsar may suffice at the middle stage to give the pupils of this stage an idea about operations on a wheat farm in a distant part of the country as Tamilnadu. However, at the Higher Secondary stage some half a dozen sample states could be taken up for the purpose. At the same time if it were the case of the study of the farming in the Prairie region of Canada, the sample study of a wheat farm near Winnipeg or Edmonton could suffice. The virtue of sample study lies in loosening the stranglehold of sweeping generalizations in the study of geography which is a source for widespread misconceptions.

Simulation

Simulation practices are one of the recent contributions in education. This helps in representing a complex situation in a simplified form. Simulation or analogue, although different from the real world, presents significant features of the real world, and 'has basic properties for the purpose of a study. A simulation is a technique in which processes or situations are re-enacted in a way which makes it convenient to visualise their basic structures and to emphasize 'their essential features'.*

This practice has twofold objectives :

- (i) spur to increased motivation to learn, and

*Waldford, R : *Gaming in Geography* (Longmans (1969) and also by the same author : *Operational Games and Geography Teaching* (in *Geography* Vol. 54 Part I January 1969 pp 34-40).

- (ii) help in pupils' involvement through role playing as actual decision makers.

Simulation of situations is confined to providing a chance to an individual exercising some kind of flexibility in decision making in relation to the environment. This may apply as much to the farmer battling against the weather, as to industrialists, planners and preservationists conflicting over desirable land-use in a town and so on. Some of the important areas in geography for simulation in the classroom may be such diverse topics as exporting, commuting, shopping, developing mineral resources on land and at sea, organizing transport networks, or locating industry, growth-centre, central place, new town and the like. At the same time, these areas may also be utilized to foster oneness and integration of our country through wise decision-making in the context of the country as a whole, locality being perceived as a part of the nation-state.

Simulation lays stress on the "discovery" method. Considerable data are given to students covering fictitious or real situations. With careful teacher guidance students are led to construct the total situation, study it and then draw their own conclusions. In the interest of scientific spirit, these inferences have to be free from local or regional bias. An example given below may clarify the point.

Suppose a decision is to be sought for the location of a steel-manufacturing plant at some suitable place in India. This involves the activity to learn those factors which affect the location of a steel-manufacturing plant. The pupils are divided into groups of six, each assuming a decision maker's role in the company which include a President, a Sales Manager, a Production Executive, a Purchasing Officer, a Personnel Manager and a Financial Adviser. The teacher acts as a Research Consultant for each company group. An outline of each of the roles is made available to the respective member of the company who discusses pros and cons concerning the location of the new steel plant vis-a-vis the existing ones. Discussions are free from local and regional considerations, and the national goals are given priority. Each role is also given certain pertinent statistics concerning such matters as raw material costs, freight rates in the movement of raw materials, location of other similar companies, the size of potential markets, and so on, for each of the states of India. Each member of the company is, then, required to decide the best possible location from his point of view and argue his case in the committee. Eventually a final decision is reached about the location. A final report is then drawn up. This report alongwith the cases presented

by each group of participants may be exhibited at a suitable place in the school library.

Project

'Project' is another method which, though to some extent similar to 'simulation', is different in terms of duration and execution. There is an emphasis not only on the "discovery" but also on "planning" in the project method. Pupils are required to plan and execute. The project is undertaken in a realistic situation and should result in a product—intellectual or material. There is a 'Project Director' for the guidance of pupils. Some of the significant projects which may be undertaken by a group of pupils at the school stage, especially to foster national oneness, are listed below :

- (a) Preparing a relief model of our India.
- (b) Study of the 'Monsoon' in India.
- (c) Discovering sites for developing 'National Parks'.
- (d) Making projects for adequate sites to establish Agricultural Experiment Station in India.
- (e) Multipurpose River Valley Projects—assessment of existing sites and projections for future.
- (f) Depicting a net of National Highways on a relief model of India
- (g) Growth and distribution of cities in India with a population of over one lakh through maps and diagrams.
- (h) Preparation of models showing typical natural and artificial harbours in India.
- (i) Writing scripts describing diet and dress habits of peoples in various parts of India.
- (j) Organising school geography-room exhibitions emphasising national plans concerning agricultural and industrial production.
- (k) A project (by charts, graphs, maps, statistics and models) showing regional-interdependence in terms of :
 - 1. Foodgrains and commercial crops.
 - 2. Manufacturing industries.
 - 3. Opportunities for higher education in science and technology.
 - 4. Transportation and trade.
- (l) Project showing various cultural centres of India (by pictures, maps, photographs and short scripts),

An Example

To show the process underlying the project on 'Preparing a relief model of our India :

1. The director finalises the objectives after thorough and frank discussion taking place among all the participants of the project.
2. The entire team is divided into the following six working-groups :
 - (a) Group working on selection of an adequate site within the school premises where 'Our India' will be projected in the form of a group-model.
 - (b) Group working on boundaries of our country—both national and inter-state.
 - (c) Group working on modelling relief features and major drainage system of India.
 - (d) Group working on—
 1. Location of national and state capitals,
 2. Important towns,
 3. Industrial centres,
 4. Multipurpose River-valley projects.
 - (e) Group-working on major railways and roads.
 - (f) Group actually involved in modelling, colouring and giving final touches.
3. The entire team of participants will assess the work at various stages in terms of stated objectives and bring about changes, if necessary.
4. A write-up on the project will be finalised containing details about the expenditure on the model and hints for its use.

Additional Issues in Teaching Geography

(i) Teaching the Controversies

A geography teacher has many a time to deal with controversial issues and if he lacks a training in geographic perspective, he fails to handle the situation gainfully. Often he is seen either avoiding the situation or taking a partisan view. He should, as a matter of fact, uphold that "Our country is a geographical and economic entity, a cultural unity amidst diversity, a bundle of contradictions held together by strong but invisible threads" (Pt. Nehru). The controversial issues mainly concern river-water disputes, boundary disputes, disputes regarding plan allocation and disputes about establishment of national or central institutions—technical, educational, agricultural,

health, etc. We are familiar with the disputes like boundary problems between Maharashtra and Mysore or UP and Bihar. Some of the states of our country have raised their voices against the Centre for being treated step-motherly in releasing financial aid and plan-allocation, and also in giving adequate representation in the central services. It is a pity that national energies are wasted over needless controversies. The rivers, the water-falls, the mines and oil and coal resources, our mountain peaks and forest-wealth belong to all of us and future generation will not forgive us if these are not properly husbanded for the greatest good of the largest number. We are proud of the personalities like M. Visvesvaraya and C.P. Ramaswamy Iyer who dreamt of a national grid for electricity and for the waters of the Ganga to flow into the Cauvery. They had conceived of India as a single nation and thought of what was best for all people. Their dream has now come true and we all know that the Ganga-Cauvery grid is going to become a reality.

Teachers must emphasise during the course of a lesson that smaller systems merge to form larger one and administrative boundaries among the various States of our country are arbitrary and artificial and exist only for the sake of administrative convenience. Controversies and disagreement among our various States may be handled in the class-room with the following objectives in view:

- (a) Social sciences have their practical bearing in achieving the goal of social, economic and political development at the national level first and then at local and regional levels.
- (b) Plans have the objectives of seeking development of masses rather than classes and individuals.
- (c) Defence, Multi-purpose projects, Five-Year-Plans, Transport and Communication, Information and Broadcasting, Education, Water Power and Irrigation, Heavy and Large-scale industries etc. are subjects of countrywide importance, and as such the issues concerning these should be treated on the national plane and for integrated India without any discrimination for one or the other State or region.

(ii) *Teaching the Generalisation:*

Generalization is one of the most significant aspects of our thought-process, but it is very disquieting that pupils seldom get opportunity to participate in this experience. In order that students are trained in this aspect of our thought-process, it is essential that they should handle the necessary data and arrive at the generalizations themselves

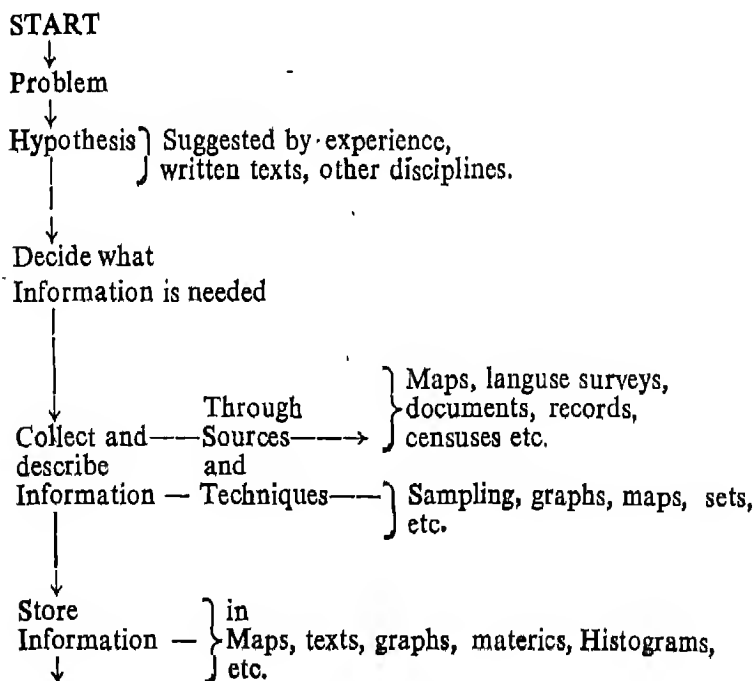
at their own level of understanding, of course with the guidance of teachers.

(iii) Accuracy in Geography Teaching:

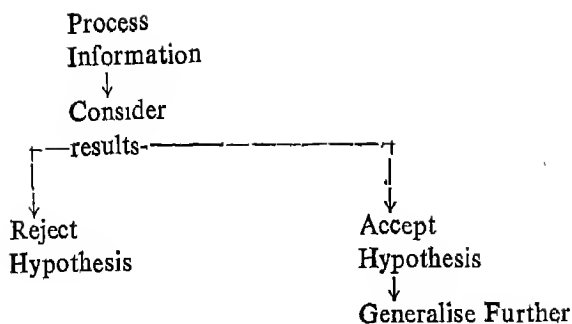
Inaccuracy in geography is the result of misuse or mis-representation of the content in geography. Inaccuracies pertain to facts, concepts, statistics, and cartographic representation. Many a time we use wrong words just because of our being over-enthusiastic about a particular aspect of a phenomenon. For example, some associate 'national integration' with 'national fervor or patriotism' which is not correct. On the other hand, there are still many amongst us who continue to follow blindly the observations of foreigners who out of ignorance or prejudice reinforce such wrong notions as 'India is a backward country', India is 'Hindu India', India is the country of elephants, snake-charmers and monkeys, people in India live on trees, etc. Such concepts should not be allowed to creep in the young minds and for this the teacher of geography has a very enviable position to explain the errors underlying them. The young pupils have even to be cautioned against such wrong statements abounding in foreign books.

Suggested Organisation of Field Work

STRUCTURE of field-work can briefly be described as follows : Begin with a problem desired to be solved. Decide the hypothesis formulated from experience, observation, etc. which is to be tested. Decide what information is needed to test the hypothesis and set about collecting this by using techniques such as samples, statistics, maps, documents and records. The results can then be considered and the original hypothesis can be rejected or accepted in which case further generalization may be developed.



43



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APPENDIX—2

List of Diagrams, Maps, etc. to be Prepared During Village Study Field Work.

1. Diagram showing annual cycle of a village.
2. Various products grown—foodgrains, cash crops and vegetables.
3. Maps showing “Rabi” and “Kharif” crops.
4. Diagram or chart showing collection of products other than agricultural from the surrounding area, especially building material, wood, mud for bricks, stones, bamboos.
5. Maps showing location of the village and its surrounding ‘Māndī’ towns to which villagers often go to buy articles of their requirements and to sell their products.
6. Map showing models and means of transportation between the village and towns.
7. Diagrams of circulation or movement showing time and cost involved and its effects on movement of products.
8. Maps of Mandi-Towns and their source for manufactured items (which villagers generally purchase from nearby mandi town.)
9. Diagrams showing rural-urban links, complementary functions, symbiosis, etc
10. Model showing rural-urban system as prevalent in India.

APPENDIX—3

Village Study Questionnaire

(a) Physical Setting (Use one inch, half inch and quarter inch toposheets to describe natural site, landforms, drainage, etc.).

(b) Land-use pattern :

(1) Cultivated

(2) Uncultivated

(i) Unused.

(ii) Under grazing pastures,
common land etc.

(iii) Under Abadi.

(c) Cropping pattern :

(i) Cultivated + Fallow = Total area

(ii) Types of farming practices.

(iii) Landuse of the farms—(to be shown on outline maps of the village including fields).

(1) Kharif cropping pattern

(2) Rabi cropping pattern

(iv) Acreages and percentages of major crops grown :

Arable crops	Actual acreage	% of the whole farm
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1.

2.

3.

Total arable area

(d) Livestock

Type	Number	Purpose
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1.

2.

3.

(e) Animals purchased and marketed.

Type	Time (month, year)	Market-place
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1.

2.

3.

Milk produced and marketed :

1. Average annual yield.

2. System of marketing (retail, co-operative, etc.)

3. Supply-areas : Rural-Urban.

4. Amount or % locally consumed.

(g) Other animals, poultry, etc.....

Their use.....

(h (Farm-economy :

1. Nature of ownership.....
 2. No. of farmers : Owner.....Rent-payers..... others.....
 3. No. of people working as labourers :
Full time.....part-time.....Seasonally.....
 4. Fertilisers : TypeVolume..... ..Value.....
 5. Power : Type..... Volume.....Value.. ..
 6. Irrigation : Type.....Volume.....Value.....
 7. List the machinery used on the farm.
 - (i) Implements common to all farms.....
 - (ii) No. of farms of special implements and machinery.....
 - (iii) Approx. annnal expenditure incurred on implements and machinery.....
- (i) Circulation, Movement etc.
1. Is the village on, or linked to, a surface road... ..
Distance from village to surface road.....
 2. Vehicles used for transporting foodgrains and other crops to nearby 'mandi'.....

PART II

INDIA'S SIZE AND LOCATION

Overview

IT WAS no mere coincidence that Vasco de Gama met Indian merchant ships on the East African Coast, as also the extension of the great Rajendra Chola's empire across the expansive sea on to the eastern archipelagos. It is an acceptance of India's unparalleled strategic location that a whole ocean has been named after her. It is almost commonplace to say that one who is the master of the Indian ocean is the master of the Orient. Dr. Vera Anstey was right when she admitted that the British Dominion over India had turned the Indian Ocean into a "British lake". The chain of naval-air bases across the Indian Ocean already established or planned by Super Powers remotely situated, is an attempt "to keep up the sphere of influence", a kind of imperialism. A vigilant eye on the vast Indian Ocean is, therefore, of prime need for India's national security and commercial prosperity

People have poured into this country during the ages past through the sluices, few and far between, in the western mountain wall of the Indian sub-continent. It may be wrong to call them subjugators for they never went out and only got entrapped in Indian society.

Located in the belt of the trades, India could normally be taken to have been doomed to an Arabian aridity but it is not so; its parts vie in raininess with the best of equatorial specimens. These and many others are the facts of Indian environment which cannot but be explained as consequences of India's locational assests and liabilities.

In order to understand the full significance of India's location it may be necessary to distinguish between the term, Indian Union and Indian sub-continent. The latter is a geographical unit comprising of

such countries as Indian Union, Bhutan, Sikkim, Pakistan, Bangla Desh, Nepal, Ceylon and even Burma. Some geographers name it as South Asia as distinct from the S W. and the S E. Asia. But some may still hold that the term, South Asia does not so successfully express the characteristics of the region as does the term, Indian Sub-continent. However, it is open to anyone to exercise one's own choice about the term, Indian Subcontinent.

The Indian Union is one of the biggest countries of the world and certainly the most outstanding one in the Indian Sub-continent. These facts should clearly be understood in order to visualize other facts of Indian environment clearly and in proper perspective. For example, it may not be quite so depressing to hear of India's ninth place among iron-ore producers of the world as when we learn that for no reason but for our shaky progress India lags behind even such small-sized countries as France, West Germany, Sweden, Venezuela. The study of this Unit is expected to create a healthy anxiety and a sense of urgency among pupils. They may indubitably realize that the advantages of location can be fully capitalized by well integrated action on all fronts by the nation as a whole, and even by seeking close cooperation of other sister nations of the sub-continent.

The unit on "India's location and Size" is quite a fundamental one. It includes an outline study of India's borders too, for obvious reasons. Usually, it serves as the start-off ground for the study of Indian Geography. Consequences of location and size are many and varied, and cannot be fully grasped just in the beginning. They become clearer as one studies various aspects of Indian environment more closely. Nevertheless, pupils need acquire an initial perspective in this regard.

Quite often teachers are seen laying comparatively much less emphasis on this aspect than it in fact, deserves. Teaching is confined to names of neighbouring countries and statements identifying situation on geographic grid. This, though necessary, is just rudimentary information. It is, perhaps, taken up in lower classes too. Here, the study ought to involve some higher mental processes. The geo-political implications may particularly need to be highlighted, of course in a simple manner.

The teaching of this unit should not be rushed through, it being the first of the series on Indian geography and at the same a basic one. Pupils should have an opportunity to visualise India as an outstanding nation and absorb this idea.

Instructional Objectives

Given below are some significant instructional objectives which should be kept in mind while teaching this unit. Teachers may suitably adapt and expand them. Information objectives which mainly involve memorization have not been stated for the simple reason that they are automatically covered under the instructional objectives involving higher mental processes. The statement of content is likely to take care of them. Here, some of the objectives which involve thinking, practical skills and the affective aspect (interests and attitude) of child's life are suggested.

Thought Processes :

1. The pupil arrives at (generalises) some major ideas relevant to this unit and understands their implications, such as :

- (i) Bharat, the Indian Union, is one of largest countries of the world and is the biggest among those of the Indian subcontinent.
- (ii) The Indian sub-continent representing one of the five facets of the vast landmass of Asia occupies quite a central and key position at the head of the vast Indian Ocean.
- (iii) Between the high mountains of Asia and the vast Indian ocean, Indian Union is so located that she falls on several important international air and sea routes passing through her.
- (iv) The land frontiers of the Indian Union emerging as result of the partition in 1947, are strategically unnatural and therefore need our careful vigilance
- (v) India's peninsular maritime projection is climatically, strategically and commercially one of her most significant assets.
- (iv) The low-latitude oceanic location of India toward the South eastern margins of the continent has a very great significance for India's climatic pattern.
- (vii) Being cut off from the rest of the continent by high mountains, the Indian sub-continent exhibits a geographical personality peculiar to itself in many ways.
- (viii) The land's and location of Indian sub-continent has turned it into a crucible of racial and cultural admixture.

2. The pupil compares and contrasts India's locational advantages and disadvantages with those of (i) the countries of Indian subcontinent, (ii) countries of Asia, (iii) Countries around the Indian ocean and (iv) the great powers of the world.

3. The pupil classifies various section of Indian border from different standpoints, such as land defence, inland trade, language affinity, naval defence etc.,

4. The pupil explains or interprets various terms, concepts, trends etc., such as centrality of location, sphere of influence, military bases, sea board, and such others.

5. The pupil identifies various cause-effect relationships arising out of locational advantages with commercial spheres e.g. market for export, cost factor in transport, accessibility, cultural contacts, and such others.

6. The pupil draws inferences regarding India's economic and political policies and their world impact as affected by her location and size.

7. The pupil exhibits ability to think independently about various issues as the result of his study of this unit e.g., India's reaction to "Anglo-American" bases in the Indian Ocean, USA-USSR rivalry, India's preparedness to face the decreasing importance of the Himalayas as a safe border, the unnaturalness of her international border within Indian-Sub-continent, India's increasing influence in Afro-Asian countries, etc.

II. Practical Skills :

1. The pupil draws maps and sketches to elucidate the facts of India's locational assests and liabilities.

2. The pupil prepares simple cartograms to compare various aspects of India's size with those of other important countries of the world.

III. Interests :

1. The pupil reads news regarding India's neighbours and the Indian Ocean, international sea and air routes with added interest.

2. The pupil discusses matters concerning the geopolitical significance of India's location.

3. The pupil collects information regarding sizes of different countries with a view to comparing them with India's size.

4. The pupil tries to seek explanation of some of the events of India's past in terms of her locational advantages and disadvantages.

IV. Attitudes :

1. The pupil acquires a sence of urgency regarding.

(i) India's pace of economic progress and political influence commensurate with her size and location.

(ii) India's defence and commercial interests, especially as affected by events in Asia and the Indian Ocean.

2. The pupil develops a sense of healthy patriotism by appreciating the country's needs and problems in the context of the need and problems of other countries.

Content Analysis

The unit deals with two aspects of India's geographical environment which because of inter-relatedness of the content are intended to be taught under one label. It may be open to any one to teach them separately, treating either of them first. Here, the content matter in respect of size of India is analysed and stated to begin with. This is almost arbitrary. The content is stated according to major ideas. The major ideas have for practical reasons been grouped together in some cases. Given below are important teaching points.

Major Idea No. 1.

India represents nearly $2\frac{1}{2}\%$ of the total world land area (32, 68, 090 Sq. Kms. as on 1.1.1966).

Among the big countries India ranks seventh after U.S.S.R., Canada, China, U.S.A. Brazil and Australia. Among the countries of Asia (excluding USSR) India is the second largest, about a third in size of China but with nearly 50% more cultivated land than the latter. Of the countries occupying the Indian sub-continent, India is by far the biggest accounting for no less than 60% of the area.

2. The Republic of India presents a shape of an irregular quadrilateral with apexes in Gilgit (Jammu & Kashmir), Saurashtra (Gujrat) Lohit Division (Arunachal) and Kanya Kumari (Tamil Nadu). The North-South and East-West diagonals are almost equal, nearly 3200 and 3000 kms. respectively. The extent in terms of latitudinal and longitudinal degrees is as follows :

North South :

From	7°N	to	37°N	Total degrees	30°
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East-West :

From	68°E	to	97°E	Total degrees	29°
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3. India has both a long coastline as well as a long land frontier. The coastline extends to nearly 6000 kms and land frontier to nearly 15000 kms.

4. Drawing of the outline map of India may be introduced at this stage. It is preferable to follow the geographic grid method. In case this skill is not needed, the map of India may atleast be studied in detail with regard to the recognition of the broad features of the

shape of the country and measurement of dimensions such as the following :

North-South and East West lengths, lengths of the land frontier and the sea board, lengths of Dwarka-Gilgit, Gilgit-Lohit, Lohit-Kanya Kumari and Dwarka points both as the crow flies and also as running along the actual boundary.

Major Idea No. 2 & 3

1. Location has two important settings, physical and political. The physical setting has two main morphological types—land and sea board. Accessibility is one of the most significant qualities of a locational setting. Accessibility has to be judged functionally and not merely in terms of direct physical measurements. Accessibility depends on technological advancement too. India can be said to be closer to Arabia than to China functionally although India has a common border with the latter for the simple reason that trade relations with China would very much mean going the long way past the Malacca Strait and the South China Sea. Sometime ago the Himalayas were considered a stable border-limit on account of its inaccessibility. Of late, the construction of motorable roads along it on the Tibetan side has forced us to do the same on our side. The border is very much live now. This point of view, may have to be presented to pupils in a very simple and concrete terms.

2. Land Frontier :

From the point of view of accessibility, the mountain ranges across Asia as they emanate from the Pamir Knot give this continent four facets (Almost like a pyramid)-- (i) N.W. Low-land (ii) Eastern mountains, plateau and plain complex (iii) S.W. Table lands and (iv) the Southern plains and plateau complex. To this may be added the island and peninsular system of S.E. Asia. The Indian sub continent represents the southern face of the Asian pyramid cut off by the lofty Himalayas in the north, the Sulaimans reinforced by the Hindukoh in the west and highly dissected mountainous terrain in the east.

3. From West to east India's land frontier is common with Pakistan, Afganistan, China (Sinkiang), China (West Tibet), Nepal, Sikkim, Bhutan, China (East Tibet), Burma and Bangladesh.

4. The Indian boundaries with China (Tibet and Sinkiang) and Burma are fairly well marked by natural barriers but not so with other countries. Sri Lanka (Ceylon) is separated by sea. The boundary with Nepal does not have any naturalness and runs most of its length through the sub-montane Terai Region. The same is

true for Sikkim and Bhutan. The boundary with Pakistan and Bangladesh is even more unnatural and arbitrary.

5. The lack of a natural boundary between India and Pakistan leads to a variety of difficulties (i) disputed territorial possessions (ii) contraband trade (iii) special defence preparations. The dispute over Kashmir belongs to a different category where Pakistan has blatantly played the aggressor's role.

6. The Sino-Indian border dispute is another example of unfriendly behaviour of another aggressive neighbour. MacMahon Line which follows the principle of watershed as boundary demarcation in the eastern sector, is not being respected by the Chinese Government. It lays claim over 13500 s.q. kms of our land. This area forms our Arunachal Pradesh, previously called, NEFA (North-East Frontier Agency) consisting of the Divisions of Kameng, Subansiri, Siang, Lohit and Tirak.

7. In the Western Sector the Chinese have claimed and have occupied 60,000 s.q. kms of our land. This forms the Aksachin area of Ladakh (Jammu and Kashmir State).

8. The important passes across our mountainous border connecting our country with our neighbours may be identified as follows :

Manipur P., Tuzu P., Thag La, Diphu La, Nathu La, Chumbi Valley P., Niti P., Lipulekh P., Shipki La, Lanak La, Karakoram P., Muztag P., Parpik P., etc. (La means a pass).

9. *The Sea Board and Beyond :*

India's location at the head of the Indian ocean is unique. Its commanding location may be understood in terms of access to the Bay of Bengal Sea board (Bangladesh and Burma) ; Australasian Sea Board (Indonesia, Australia), African Sea Board (S. Africa, Mozambique, Tanzania, Kenya, Ethiopia Somalia Sudan and, U.A.R.) ; Arabian Sea Board (Yemen, Saudi Arabia, Kuwait, Iraq, Iran and Pakistan : and Island countries to the South (Ceylon, Mauritius, Malagasy) directly across the waters of the Indian Ocean.

10. India Possesses Andaman and Nicobar groups of Islands (Bay of Bengal) which swerve out very close to Indonesia (nearly within 500 kms. of Sumatra) and Laccadive and Minicoy groups (Arabian sea). These are of particular significance for our naval power.

11. South of these Islands are a number of Island groups some of which are being sought and even bought for building a chain of

naval and air bases by U.K., U.S.A., USSR etc. The strategy of these bases may have to be understood in the light of our defence and commercial interests.

12. India is having very close trade relations with the countries located around the Indian ocean - markets for Indian piecegoods, engineering goods, etc. Indian emigrants have settled down in many of these parts. e.g. Sri Lanka, Malayasia, East African countries, Mauritius etc. The Indian settlers are handling a substantial proportion of internal trade in these countries. They even supply labour force and technical know-how for the development of these newly coming up nations.

13. Important international trade routes pass through Indian Ocean with Bombay and Cochin as important ports of call. Some of the these routes which are of vital interest to us are (1) Europe-Australia via Suez ; (2) Europe-East Asia both via Suez and the Cape of Good Hope and (3) West Asca-East Asia (China, Japan, Korea and Indonesia and Eastern Pacific Sea-board (Canada, USA, Peru, Chile, etc.) via Singapore.

14. India by virtue of its being at the head of a vast ocean becomes a hope-step point for air communication. Importance of Delhi, Bombay and Calcutta is particularly great as international airports. They lie on Europe-Australia, Europe-East Asia, and USA-Middle East routes.

15. When India was under British rule, the British went to the extent of considering the Indian Ocean almost as the "British Lake". This shows the strategic importance of India around the Indian ocean. However, emerging India does not lay such an imperialistic claim but this does not in any way lessen her responsibility about peaceful Indian Ocean by protecting it from becoming a centre of cold war. The problem requires a vigilant eye and imaginative handling. The failure of India to give leadership in the maintenance of peace in this zone may be a major strategic and commercial disaster for the whole sub-continent in general and for our country in particular. A reference may be made to Power Blocks and Treaty Organizations such as SEATO and CENTO.

Major Idea No. 4

1. The partition of the erstwhile India in 1947 has been artificial in the geographical sense. By and large, the land boundary with Pakistan do not follow natural features. Even the cultural and linguistic distinctiveness is missing. The basis has been, purely political.

2. The location of India vis a vis Pakistan needs special care. The border stability and peaceful co-existence require special efforts.

3. The location of Bangladesh (This country became independent after breaking ties with Pakistan) vis a vis our States of W. Bengal, Assam, Meghalaya, Manipur, Tripura and Union Territory of Mizoram may be examined in respect of boundary line. The communication between our eastern sector and rest of the country through a narrow neck in north Bengal presents a series of problems but the help rendered by India to this country is likely to be appreciated and as a result the growing friendly ties based on commonness of economic and cultural interests may considerably diminish the difficulties.

4. A comparison with similar border problems of the nation states of Europe may be enlightening.

Major Idea No. 5 and 6

1. The peninsular shape with Tropic of Cancer as the base of the triangle gives India an unexpectedly large sea-front. This extensive sea-board for ages long had acted as a safe border till the advent of the Europeans. In the modern times a sea-front is strategically much vulnerable than the land frontier in view of submarine actions, aircrafts carriers, etc. The location of the great Power naval-air bases eg. cocos Isles, chagos Archipelago, Maldives, Seychelles Tamatave (Madagascar), Aldabra Isles etc may be identified and their direction and distance for Indian main land may be visualized.

2. This extensive sea-front has helped India to become a commercial nation. The ports of Broach (Bharukachh or Barbicon of Greeks), Dwarika, Kozikode, Tambralip (Tamluk), etc., remind us of the past deeds. In modern times the growth of such large port towns as Calcutta, Bombay, Madras, Cochin, on the sea coast, is the continuation of the old tradition with an added impetus. New ports are being developed, e.g. Kandhala, Marmagao, Paradeep, etc.

3. The peninsular extension towards the south, deep into the Indian Ocean brings India relatively closer to the countries bordering the Indian ocean. Columbo in Ceylon which is as a matter of fact a mere continuation of the Indian peninsula, acts as an important international hop-step point both for air and sea traffic. Next to it, various places e.g. Cochin, Bombay, etc. on the mainland supplement this role.

4. Peninsular projection brings about mollifying maritime influence over a large part of the country. The South should have been hotter than the north on account of its nearness to the Equator but the fact is otherwise. Continentality of the north makes the heat equator of India move to north-west during the summer season — a no mean tribute to the maritime influence (Other consequences may be studied under the unit on climate).

5. The peninsular shape of the country has resulted in certain cultural contacts which cannot be explained on the basis of commonly known history of India. People of Laccadive speak a dialect which is nearer to Arabic than to any Indian regional language. Islam spread in the North in the medieval fanatic tribal way, not unexpected of neo-convert Seljuk Turks and others, but in the South it came the persuasive way characteristic of the Arab traders. The Christians of the South (Kerala) are older in their faith than their coreligionists in Europe. It is easier and safer for religions and cultures to float across the sea than to jolt past the craggy and hostile land frontiers where resistance and counter-resistance perhaps assumed a much horrifying form, certainly in the past.

6. The stretch of India from the tropical to temperate zones endows her with a variety of patterns in temperature distribution. The locational shift towards the east enables her to benefit from the rainbearing Monsoons of which Arabia and other western neighbours are relatively deprived. (This aspect may be dealt with in detail in connection with the study of India's Climate).

Major Idea No. 7 and 8

1. The high mountains of the north isolate the Indian Sub-continent from the rest of the mainland of Asia with the result that India was never able to keep a vigilant eye on the socio-political events taking place in those parts. Consequently, she had to be subjected to many a surprise invasion from these parts. Lord Curzon's Central Asian policy was a departure from it. Akbar and his able successors were also consciously alert in this regard.

2. Mackinder's thesis regarding the "Heartland and World Island" embodies some significant geopolitical generalization which may be presented to pupils in a simple manner, but giving opportunity to examine them critically. His knowledge of history and current affairs should be brought to bear on these issues.

By 'Heartland', Mackinder means central land-locked part of Eurasia and by 'World Island' the composite land mass of Europe, Africa and Asia. The maxim goes as follows :

"Who rules East Europe commands the Heartland ; who rules the heartland commands the world-Island ; who rules the world Island commands the world."

American interests in the world-Island to checkmate the moves of the U.S.S.R. which is the major shareholder of the 'Heartland'. may be of interest to students. The Americans have, largely after a theory enunciated by Spykman, adopted the view that 'rimland' surrounding world Island should be controlled to contain the outflow from the Heartland. This rimland in the American eyes appears to be a 'Shatter-belt' of small nations whose internal and external affairs can be easily so influenced and supported as to serve as bulwark against U.S.S.R., China or any other country and their ideologies not favourable to U.S.A. and her allies.

3. India's role in this regard needs to be visualised. An initiation in thinking on these lines may be worthwhile. The concept of dynamic neutrality, doctrine of Panch Sheel, significant nonalignment and emergence of a group of non-aligned nations may be examined. This provides an opportunity to acquaint pupils with simple geopolitical concepts, so necessary in an intelligent study of geography.

4. Isolationism had led in the past to the growth of conservatism in Indian Society. We faced the North with back and found the sea in the front'.

Northern mountains as climatic barrier have given India an environmental setting distinct from the land immediately bordering it. (This may be studied in detail in the context of the climate of India.)

5. India bordered by mountains and washed by seas, has behaved like the end of a landmass. Consequently, whoever entered it whether as a conqueror or as a peaceful migrant ended his journey within it. A large variety of races, cultural-patterns and religious beliefs are nothing but a natural consequence of it.

6. In spite of a vast variety in practically all respects (natural and cultural), India on account of its geographical distinctiveness, has developed a personality of her own. The whole Indian sub-continent evinces a kind of oneness. Unity in diversity as applied to Indian Union has a peculiar flavour of its own.

This generalization about distinctiveness born out of a sort of environmental perception should not be pushed to an extreme. The sea on her west and on her east and pathway across the North-West mountain ranges (relatively less formidable barriers) have facilitated

enough social, cultural and economic contacts with out-side world in past, both ancient and medieval. The Indian settlements in the Far East associated with such historical names as Vijaya dynasty, Champa, Kamboj, Subarnabhumi, etc ; the spread of Indian mathematics, science and philosophical systems to the west ; wide adoption of Indian numerals ; and the remarks of Senator Pliny about Roman women's fatuation for Indian goods—all remind us of Indian advancements both in the realms of ideas and industry. The history of imports is likewise no less impressive. The Gandhar School of sculpture, the Turkish dome and Ahom traditinos (East Asian valley culture) are just a few to mention. The travellers of the past e.g. Kumarjiva, Dipankar Srijnagan, Fahien, Huen Tsang, etc. may be referred to in connection with major routes of communication to and from Indian sub continent. The locational peculiarities, it may be clearly seen, permitted a selective give and take contact with the outside world.

Teaching Hints

General :

1. The Unit is woven around eight major ideas which for practical reasons, have been clubbed together into five sub-sections. The teacher may reorganize them according to his own scheme of classroom instruction.

2. The content covered by this unit concerns such subject fields as history, civics, sociology in addition to geography. Hence, it may be presented without much disciplinary restrictions and may thus be taken as an example of a broad-field approach. As a matter of fact, the discipline of geography thrives on enrichment of its content from various other disciplines.

3. Issues raised in this unit are connected with current affairs and general awareness. This makes imperative that discussion and self-study procedures should get preponderance over formal class-teaching.

4. It is assumed that pupils have already completed one cycle of social studies, covering history and geography of India and world in their elementary classes.

5. Objectives as enumerated in the beginning should be kept in mind when designing learning activities.

Specific Hints (Sub-Section Wise)

Major Idea No. 1

Approach : Since most of the content under this subsection is information-oriented, it would be desirable to help pupils find out all these facts for themselves. They can do this in the class room itself with the help of well directed questions and atlas work (Map-Study).

Activities :

1. A number of questions such as the following may be posed :

- (i) What percentage of total world land area does Indian Union/ Indian Sub-continent occupy ?
- (ii) Arrange world's first ten largest countries in order of their sizes and represent their relative areas with help of circles/squares/rectangles/spheres/bars/columns etc. (Let the student first collect and tabulate the data)
- (iii) Arrange various countries situated within the Indian sub-continent in order of their sizes and draw cartograms to show their relative sizes.
- (iv) Some people visualize India's shape as a quadrilateral while other do so as a triangle. Comment.
- (v) 'A large area' is not always large in economic potentiality; Discuss it with reference to India and other countries larger than she.
- (vi) Map study in the classroom itself may be arranged.
- (vii) A classroom competition can also be organized.

Teaching Aids :

1. Suitable wall maps and atlases may be procured.
2. An atlas of Northern Frontiers of India published by Publication Division is very useful.
3. Hindustan Year Book, Chambers Geographical Gazetteer or Statesmen Yearbook may be used for consultation about the area, population etc. of different countries.

Major Idea No. 2 and 3

Approach : The content involves considerable thinking and has to be studied in the context of these major ideas. The teacher should start by presenting certain basic concepts such as (i) physical and physical-cum-political settings of a location. (ii) functional accessibility, (iii) centrality, etc. This may be followed by raising

relevant issues and discussion there on in relation to both the Indian Union and Indian sub-continent.

Activities :

1. Some of the issues for discussion may be as follows :—
 - (i) On what grounds can the name Indian ocean be justified ?
 - (ii) India has the locational advantage to bring the Indian Ocean under her sphere of influence to save the Indian sub-continent from the pressures of the Big Powers/Power Blocks. Examine the statement.
 - (iii) 'Political unstability of the Himalayas is Bharat's one of the greatest hours of trial. Comment.
2. Draw sketch maps to elucidate such information as (i) passes across India's mountainous border (ii) Indian territory occupied by the Chinese (iii) countries around the Indian ocean, etc.
3. Draw a map of the Indian Ocean and show strategic places and important naval bases such as the Andamans, Singapore, Cochin, Colombo, Aden, Aldabra, Chagos Archipelago, Cocos Isles, Durban, Perth etc.
4. Study the position of India on the globe and calculate direct distances from Delhi to New York, Moscow, London, Tokyo, Peking, Melbourne, and Cape Town.
5. On the map of the world locate the sea routes connecting Bombay, Calcutta and Madras with London, New York, San Francisco, Tokyo and Buenos Aires. Find out the approximate lengths of these sea lines.
6. Tabulate the distances of such places as Colombo, Perth, Rangoon, Singapore, Jakarta, Zanzibar, Durban from Calcutta, Bombay and Madras or Cochin.

Teaching Aids :

The following aids are suggested :

1. A globe for measuring distances suggested as part of learning activities above,
2. A slate globe for marking various routes and identifying directions. In case this facility is not available in the school, the teacher may improvise. Papermache can be used for this purpose. Even an earthen pot (round) can be so employed.
3. Outline map of the world to mark the sea-routes and important cities. If the same is not available, the teacher is

advised to improvise one, using the black-board, bamboo paper after painting it black/olive green or by drawing an outline on rexin cloth.

4. Wall map of India (Physical).
5. Wall map of India (Political)
6. A relief model map of Asia to indentify relief features. In its absence bathy-orographic map may suffice.

Major Idea No. 4

Approach : Teaching for this major idea is more or less a continuation of the teaching for the major idea No. 2 and 3. The approach will, therefore, remain the same as for the previous ones.

Activities :

1. Discussion may take place around the following issues :
 - (i) There is always some or other trouble on the Indo-Pakistan border in spite of all efforts to map out the bounaary in detail.
 - (ii) The Indo-Pakistan border lacks natural features. Why ?
 - (iii) Justification for the location of big army establishment at Jullundur, Barmer, Ferozepur, etc.
2. Study the report of the Indo-Pakistan border settlement (Radcliffe Award), if you can find a copy of it.
3. Draw a map of India and show all the places connected with Indo-Pakistan conflicts.
4. Study the boundary which India shares with Bangla desh.

Teaching Aids :

1. A large scale map of India showing Indo-Pakistan Indo-Nepal, Indo-Bāngladesh borders.
2. Relevant extracts from press reports and other papers about Indo-Pakistan conflicts. (See the newspapers and magazins for periods, especially 1948, 1965 and 1971).
3. Maps and accounts of Pakistani invasion of J & K (1948) Indo-Pakistan War (1965), Kutch confrontation, the 14-Day war in 1971 with Pakistan, Border line movement of our forces for the liberation of Bangladesh.

Major Idea No. 5 and 6

Approach : The teacher may begin by discussing the shape, dimensions, and locational direction of peninsular India, followed by discussion about its consequences. Study of map should form a

substantial part of the teaching-learning procedures in this regard.

Activities :

1. Discussion may be held on such issues as the following :
 - (i) India's peninsularity is responsible for greater maritime activity in the South than in the North.
 - (ii) Climate becomes increasingly extreme as one goes towards north-west.
 - (iii) Peninsular shape of India has a significant influence on the climate of India.
2. Draw maps of India showing :—
 - (i) Important trade routes.
 - (ii) Paths of the monsoon (Students have read about it in earlier classes).
 - (iii) Route of Vasco da Gama through the Indian Ocean. (The information expected is of a very elementary type, as it is expected to have been acquired in lower classes).

Teaching Aids :

A large scale map of Indian Ocean. If it is not available it can be drawn by the teacher himself from an atlas.

Major Idea No. 7 and 8

Approach : India is said to be physically isolated from the world by mountains and seas. This fact can easily be brought home to pupils with the help of a physical map. The limitations of this broad generalization may be brought home with the help of a well-directed discussion.

Also, the fact that Indian sub-continent presents a geographical unity may be brought into relief, apart from the unity of the Indian Union. The pupils should be cautioned against harbouring any feeling of aggressive nationalism. The homogeneity of Indian sub-continent should mean very friendly and helping attitude towards other nations lying within this geographical unit.

Activities :

1. The pupil may be asked to identify the boundaries of India and name the important features.
2. The role of the Himalayas as 'protective wall' should be discussed in detail.

3. The student may be asked to present report about important invasions to which India was subjected during the past ages. An attempt may be made to identify the contribution made by incoming people to the present day culture and racial composition of our nation. (The pupils may use their knowledge of Indian history studied earlier)

Teaching Aids :

The following teaching aids are suggested :—

1. A relief model of Asia to clarify lines of invasions.
2. A map of Asia-physical.
3. A map of Eurasia showing the racial and linguistic composition. It may be drawn from some atlas.

Evaluation

Enlisted below are some evaluation exercises. Teachers may adapt them and assemble their own Unit tests according to their own requirements. The exercises ought to have been accompanied with answers but for want of space these answers have not been included.

Essay Type Questions :

1. Indian Union is a complete geographical unit by itself. Comment.
2. Delimit the Indian sub-continent by describing its possible boundaries. Justify your demarcation with suitable arguments.
3. Why are the Himalayas no longer considered effective boundary features ? Discuss it in the light of recent events.
4. India is faced with an urgent problem of strengthening her naval power in view of her maritime location. Discuss this statement in the light of Big Power naval bases in the Indian Ocean and events of the 14 day Indo-Pak War (1971).
5. Explain how far India can be said to occupy the most central position on the Indian ocean.
6. Why is India said to have a "land's end location"? Discuss with examples of its consequences.
7. How has India's "land's end location" affected the composition of the socio-cultural life of her people ?
8. Explain how India's central location is reflected in terms of international air and water ways.

9. What are the justifications for the use of the term, Indian sub-continent ?
10. State the advantages accruing to the Indian Union from her peninsular shape.

Shortanswer Type Questions .

1. What countries is the Indian sub-continent comprised of ?
2. Mention the countries of the world which are larger than the Indian Union in area ?
3. Name the countries which have larger population than India ?
4. Give approximately north-south and east-west dimensions of the Indian Union in Kms and latitudes/longitudes.
5. What percentage of world land area and world population does the Indian Union/Indian sub-continent account for ?
6. Give evidence in support of India's central position in the Eastern Hemisphere.
7. What does the name, Indo-China indicate ?
8. How could India's location be helpful in the spread of Indian culture in the S.E. Asia ?
9. What aspect of India's location best explains an early spread of Islam and Christianity in Kerala ?
10. Which part of Indian territory is closest to Indonesia ? Give the approximate distance.
11. Give reasons why the Indian Government feels uneasy about Big Power bases in the Indian Ocean.
12. Name one important Big Power air-naval base nearest to our territory.
13. State two ways how Indian climate is affected by her peninsular shape.
14. Mention any three countries with which India shares unnatural (featureless) common boarder.
15. State the principle underlying the border settlement with China in the Arunachal sector.
16. What does the Mc Mahon line signify ?
17. Name the parts of our territory which are wrongly occupied by China.
18. Enlist the countries which occupy a sea-front on the n/Western/Northern side of Indian Ocean,

19. Arrange any five countries around the Indian ocean in order of their decreasing distance from Kanya Kumari beginning with (i) Australia (ii) Union of South Africa (iii) Yemen.
20. Name three important international air/sea routes that touch some part of Indian territory.
21. Explain why it is said that India is more distant from the Central Asia than it is from Indonesia.
22. State the locational disadvantage which subjected her to incessant waves of invasions from the 'Heartland' of Asia.
23. Name four important passes across our lofty mountain border of the north in order of location beginning with Shipki la.
24. Name the passes which were most frequently used by the invaders into the Indian sub-continent from the 'Heartland' of Asia and give reasons for their being so.
25. Why has it not been possible to connect Indian sub-continent with the rest of Asia by suitable land routes ?
26. Why is Khyber pass important ?
27. What is the strategic importance of Chumbi valley route ?
28. Name two Indian cities situated close to the Nepalese boarder.
29. Which part of our territory comes very close to the Soviet land.
30. Name the countries with which we have common boundary.
31. How will the air traffic over India be affected, if Soviet Union permitted unrestricted air flight over her territory ?
32. Name two important Indian ports famous during ancient times.
33. Give evidence to show that India was once a strong naval power.
34. Name five important ports on east/west coast of India.
35. Name two gulfs along the Indian seaboard.
36. What is the nearest distance between the mainlands of Sri Lanka and India.
37. Name the Indian territory where Afganistan touches our boundary.
38. What is SEATO/CENTO ?
39. Name the member countries of SEATO/CENTO.

40. Name one of Indian States which can not be reached from outside without stepping into another Indian State. Also name the states bordering it.

Objective Type Questions.

1. Which of the following latitude has the longest east-west extent in India ?
A 10°N B. 15°N C 20°N D. 25°N E. 30°N
2. Along which of the following longitudes has India the longest north-south spread ?
A. 72°E B. 75°E C. 78°E D. 81°E E. 84°E
3. Which of the following indicates best that India commands a fairly central mainland position on the India Ocean ?
 - (a) Bombay has developed into the largest port of the Indian Ocean.
 - (b) England-Australia air route passes through India.
 - (c) Europe-Far East air and sea routes pass through India.
 - (d) India is almost equidistant from S.W. Australia and South Africa.
 - (e) Europe-Australia shipping line via Suez touches Indian ports.
4. Which one of following political units of India does not touch the Chinese border ?
 - (a) Jammu and Kashmir.
 - (b) Himachal Pradesh.
 - (c) Uttar Pradesh.
 - (d) West Bengal.
 - (e) Assam.
5. Which of the following mainland ports can be said to occupy the most central position in the Indian Ocean ?
 - (a) Karachi.
 - (b) Cochin.
 - (c) Aden.
 - (d) Zanzibar.
 - (e) Perth.
6. The country with which India shares a very unnatural land-frontier is
 - (a) Soviet Union.
 - (b) China.

- (c) Afghanistan.
- (d) Pakistan.
- (e) Burma.

7. Which of the following air routes is least likely to pass through India ?

- (a) Sydney-London.
- (b) Jakarta-Moscow.
- (c) Tokyo-Karachi.
- (d) New York-Bangkok.
- (e) Kabul-Manila.

8. Given below are some characteristics of India's location marked as A, B, C, D, and E. Put the relevant letter in [the space provided against the statement given further below :

- A. Land's end location.
- B. Peninsular sea-board.
- C. Low-latitude location
- D. Existence of high mountains in the north.
- E. None of the above.

The northern part of Indian Union experiences severe cold during winter.

- () The climatic cycle of a large part of the country contains a dry-hot period and a hot-wet period only.
- () People entering India as invaders in the past did not either return or go forward out of her.
- () Though almost a quadrilateral in shape, India has a fairly long sea-board.
- () Nearly half of India evinces a distinct maritime influence on her climate.
- () The most vulnerable point in India's defence in ancient and medieval times, has been her N.W. frontier.
- () India needs a strong naval force in modern times.
- () Ethnologically and culturally the southern part of India provides traces of most ancient culture.

Map and Practical Work :

1. Draw a map of the world showing India in the centre.
2. Draw a map of the Indian Ocean and show (i) important sea and air routes passing through India, (ii) countries located around it, (iii) important ports and (iv) Coco islands,

- chagos Archipelago, Aldabra-Massava Chain of Anglo-American air-naval bases.
3. On a map of Asia show the countries surrounding the Indian Union.
 4. Study the globe and name five important foreign cities falling within each of the following circular belts with Delhi as centre :
 - (i) 0-1000 miles (ii) 1000-2000 miles (iii) 2000-4000 miles
 - (iv) 4000-6000 miles (v) 6000-8000 miles.
 5. Study the globe and measure the distances as the crow flies from Delhi to (i) Moscow (ii) London (iii) Tokyo (iv) New York (v) Melbourne (vi) Capetown (vii) Singapore (viii) Cairo.
 6. On the map of the northern boundary of India and approximate limit of Indian sub-continent show
 - (i) Bolan, Khyber, Muztagh, Karakoram, Shipki, Nathula, Thagla, Lanakla, Niti and Tuzu pasees
 - (ii) The sources of rivers Indus, Satluj, Ganga, Ghagra and Brahmaputra.
 - (iii) The mountain ranges of Karakoram, Laddakh, Kailash, Great Himalayas, Patkoi, Lushai, Sulaiman, Hindukoh.
 - (iv) Our area claimed by the Chinese.
 - (v) Our area occupied by the Chinese.
 - (iv) The cease-fire line between India and Pakistan in Jammu and Kashmir.
 7. On a map of Western India show the main theatres of Indo-Pakistan war.
 8. On the map of Asia indicate the area commonly designated as "greater India" and name important Indian settlements and cultural centres in the past outside the Indian sub-continent.
 9. Prepare a ground map of Afro-Asia and Indian Ocean in the school quadrangle and exhibit the important facts of India's strategic central situation (group work).
 10. Prepare a bulletin board kit on India's locational advantages and disadvantages (group work).
 11. Draw a map of India's land frontier and name the countries with which India shares a common border.

12. On an map of Asia and Indian ocean fill in the following by different colour or patterns ;
 (i) Members of the Soviet Power block (ii) Communist China
 (iii) Members of Anglo-American power blocs, e.g. members of SEATO and CENTO and (iv) Non-aligned countries.

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SAMPLE TEACHING UNIT II

SURFACE FEATURES OF INDIA

Overview

EVERYWHERE in the world surface features of a country play an important role in influencing human life of that country. The surface features of India, too, play a striking role. The expanse, height and location of India's landforms have not only influenced her past history to a great extent, but they are also indirectly influencing the way in which the people meet their needs through their influence on climate, land use, means of transportation and distribution of population.

The Surface features of India form the basis of her division into four physical regions. These four regions are distinctly different from one another. But each region is an illustration of the interdependence of these regions in many ways. For example, the Himalayan region has been uplifted in the tertiary age from the enormous quantities of detritus brought in by the then rivers from the Indian Plateau. Many similar examples can be given to prove this type of interdependence. The teacher has to emphasise this approach and ought to bring out this to students' level of awareness.

Objectives

(a) Knowledge Objectives :

1. India has four distinctive physical divisions which provide almost all the varieties of landforms needed for the balanced development of a country.

2. The Himalayas are the youngest folded mountains which because of their enormous size and great heights have proved to be a boon to the whole of Indian subcontinent in many ways.

3. The northern plains of India are one of the highly productive agricultural regions in the world.

4. The drainage pattern in the northern plains of India is such that it has been responsible for the movement of people and agricultural products and for the development of other means of communications.

5. Indian plateau is a stable landmass consisting of very ancient rocks and is a source of enormous mineral wealth and building materials besides black soil region and other soil groups good for agriculture.

6. The Vindhyas which appear at a glance to divide north India from the south are responsible for the formation of contact zone between the northern plains of India and the Deccan Plateau of south through the gaps formed by rivers flowing to the north.

7. The rivers of the Deccan Plateau are responsible for unification of the people of west coast with the people of east coast.

8. The coastal plains of Indian Plateau have provided port and harbours to the country and are rich agricultural lands.

(b) Skill Objectives :

1. Students are able to read and interpret the relief map of India and are able to draw cross-sections from this map.

2. Students are able to draw maps and sketches to show the structure of the country.

3. The pupils are able to make models on cooperative basis as a project.

(c) Attitudinal Objectives:

1. The pupil appreciates how different surface features are assets to the people of India for better living.

2. The pupil develops a sense of pride in the uniqueness of India's Mountains, plains and plateaus.

Content Analysis

The content analysis of the unit is given here in terms of the major ideas. Each major idea is then broken into important

teaching points which a teacher may keep in mind while teaching the unit.

Major Idea No. 1

India has four distinct physical divisions.

Main Teaching Points :

1. The Himalayas are the greatest and the highest mountains in the world with great magnitude of relief, highly uneven surface, very steep slopes, little level land and young river valleys

2. The plains of Northern India are extremely level and the slope of the land is gentle.

3. The plateau is a part of the old Gondwana land. It has peneplained areas, residual mountains and old river valleys.

4. The coastal plains are, by and large, narrow areas fringing the Indian plateau.

Major Idea No. 2

The Himalayas are the youngest folded mountains.

Main Teaching Points :

1. The Himalayas form a highly rugged and continuous stretch of high mountainous region in the north of India.

2. Three longitudinal ranges of the Himalayas—the greater Himalayas, the lesser Himalayas, and the outer Himalayas—indicate that this region was thrown into three longitudinal folds by horizontal earth movements.

3. Enormous size and great heights of this region indicate that enormous quantities of detritus were brought both from north and south blocks to build these huge mountains.

4. Rivers flowing across the Himalayas give a clue to the fact that these mountains were uplifted slowly and that the rivers are older than the Himalayas.

5. The passes in the Himalayas are narrow and high. They are snowbound during winter months.

6. The Himalayas are an asset to the country because :

- (a) They are great wind barrier and communication barrier,
- (b) they are sources of the mighty rivers of India,
- (c) They are sources of rich forest wealth,

- (d) Their peculiar longitudinal valleys facilitate communication from east to west,
- (e) They have provided rich soil to the northern plains of India.
- (f) They are a place of great cultural value to Indian people, and
- (g) There are recreational and health centres in the Himalayas.

Major Idea No. 3

The northern plains of India are one of the highly productive regions of the world.

Main Teaching Points :

1. This region was formed by detritus brought down mostly by the rivers from the mighty Himalayas but also to some extent by rivers of Indian plateau. Continuous silting for centuries made this area a rich alluvial plain.

2. A network of rivers from the snow-fed ranges of the Himalayas is a useful source for developing irrigation facilities, hydro-electric power, inland waterways, industrial uses and similar other uses.

3. Fertile soils, level land, adequate rainfall along with irrigation facilities, continuous warmth throughout the year have made this region a favoured agricultural tract capable to produce a variety of crops twice or thrice a year. The elongated east-west extension of this region has added to the variety of products and cultures.

5. The highest agricultural potentiality of producing huge quantities of foodgrains has made this region capable of supporting a large population. Roughly a little less than two thirds of the country's population is concentrated in this region.

6. Topography and productivity of land have to a great extent facilitated the concentration of roads and railways in this region.

7. The drainage pattern of north India is such that it has facilitated the movement of people and products and also the development of other means of communications.

Major Idea No. 4

Indian plateau is an old landmass with valuable resources of various types.

Main Teaching Points :

1. Indian plateau is a part of the stable block of the earth's crust. As such it has hard crystallised rocks useful for massive buildings and other uses.

2. Age-long denudation has reduced this region into a land of undulating topography.

(a) It is flanked by the Aravallies on the north-west, the Vidyas in the north, the Sahadri or western ghats in the west, and the dissected eastern ghats in the east.

(b) It rises towards north-east to Chhotanagpur plateau, towards north to Bundelkhand-Baghelkhand-Rawa Plateaus, and towards south to the Mysore plateau.

(c) Its important parts are the Deccan plateau, Madhyabharat plateau, Rajputana upland, and Chhotanagpur Plateau.

3. Vertical tectonic movements resulted in the formation of many faults and rift valleys, such as Narbada-Tapti rift valley, Mahanadi Valley and Godavari valley.

4. In some of the rift valleys there grew thick forests which owing to subsequent sinkings and upheavals changed into coal belts such as Godavari Coal belt and Mahanadi Coal belt.

5. Volcanic eruptions resulted in the spreading of profused lava on a large tract in the west. This lava region is a famous area of black regur soil on which cotton is the most important crop.

6. Indian plateau contains rich deposits of valuable mineral resources such as manganese, mica, coal, iron, magnesite, chromite, bauxite, uranium, thorium, gold etc. which are important for the economic development of our country. Uranium and thorium are important for the development of the country as a nuclear power.

7. The triangular shape of the plateau tapering towards the south has enhanced the coastline of the country—a fact important for the development of naval power.

8. The rivers of this region are not perennial but are important from the point of view of settlement and agriculture because they have wide and gently sloping valleys. These rivers are also important from the point of view of the unification of the people of west coast with the people of east coast.

9 The Vindhyas which appear at a glance to divide north India from the south India are responsible for the formation of contact zones through gaps formed by rivers flowing to the north.

Major Idea No. 5

Coastal lowlands are rich agricultural areas and provide ports and harbours to the country.

Main Teaching Points :

1. Coastal lowlands are generally the emerged floors of the seas adjacent to Indian plateau. Vertical tectonic movements experienced by Indian plateau raised the sea floor.

This emergence is signified by raised beaches and water-cut plate-forms found on the coasts.

2. The western coastland is a long narrow belt with long offshore bars and small torrential rivers.

3. The eastern coastland is comparatively broad. It has many river deltas with fertile soils and water facilities.

4. The coastlands are comparable to the northern plain of India in agricultural products and dense population.

5. The coastal plains provide important ports to nation and good facilities for development of a strong naval power.

Teaching Hints

This section of the teaching unit consists of three aspects. Firstly, the approach to be adopted by the teacher in dealing with the major idea concerned will be described in brief. Secondly, this section will also enumerate those teaching and learning activities which a teacher may profitably employ according to his personal convictions and convenience. Thirdly, there will also be a brief mention of the teaching aids that may be of use to the teacher in following the approach mentioned earlier.

Major Idea No. 1.

Approach—The content here is a geographical fact. Factual information is better retained if pupils find out those facts for themselves. This can best be done if the students are asked to study the

physical map of India and they are well directed by pre-planned questions.

Activities :

1. Map study of a physical map of India and discussion in small groups about physical divisions.
2. General discussion about their surface features under the guidance of the teacher.
3. Physical divisions to be filled in a blank outline map.

Teaching Aids :

1. Physical map of India
2. Relief model map of India.
3. Outline maps of India.

Major Idea No. 2

Approach : This portion of content relates to the Himalayan region. This involves much thinking and interpretation of maps. The teacher may start by explaining how compressional movement of the earth results in development of folds.

Activities :

1. The map of India showing the Himalayan region in three different folds may be studied first and then important summits and passes may be studied.

2. The group discussion should follow the map study. The following questions are suggested to guide the students in map study.

- (i) Explain the formation folds in the Himalayas.
- (ii) See the Sutlej, the Tista, the Brahmaputra rivers and explain why they are shown coming from the Tibetan side across the Himalayas. Do you think that they have cut the mountains after the birth of the Himalayas? If not, what explanations do you offer for this fact?
- (iii) Why are the Himalayas called as the sentinal of India?
- (v) Examine the heights of the passes and explain why they are not used in winters.
- (v) How is the Himalayan region useful to India for monsoons, for natural resources and for the fertility of the northern plains?

- (vi) Draw a sketch map to show passes across the India's mountain barrier.

Teaching Aids ;

1. Map of the Himalayan region showing.
(i) The folds (ii) Summits.
2. Physical map of India.

Major Idea No. 3

Approach—Same as in Idea No. 2.

Activities :

1. Draw a map of the northern plain showing rivers.
2. Study of the Physical map of the northern Plain with the help of well-planned questions.

Some questions are suggested here :—

- (i) Calculate the direction of the slope from the flow of the rivers.
- (ii) Where will sea animals move when the trench is being filled ?
- (iii) Why do we find petroleum deposits in Assam and Gujarat ?
- (iv) Why is the northern plain so fertile ?
- (v) Why are the rivers of this region perennial ?

Major Idea No. 4

Approach : The content to be studied in the context of this major idea relates to the study of Indian Plateau. This study requires a deep understanding of map and involves considerable thinking on the part of the pupils. The lecture method will prove detrimental to the growth of pupils towards open-mindedness and self-confidence. It is, therefore recommended that the teacher may encourage discussion after the pupils have studied the maps in the light of suitable questions.

Activities :

1. Map study of India's geological map, the Relief map, and the map showing mineral resources in the light of appropriate questions.
2. Group discussion after the study is complete. A number of questions such as the following may be posed :—
 - (i) What message do these maps convey to you with regard to the stability of the Indian Plateau ?

- (ii) What effect, in your opinion, can long time have on the hardness or the softness of the rocks ?
- (iii) Is there any relationship between formation of minerals and the age of the rocks ?
- (iv) Name the mountains of the Indian Plateau.
- (v) What may be the cause of the formation of these mountains ? Can it be a horizontal or Vertical movement ? Can it be erosion of the surface ? What else and Why ?
- (vi) What can be the effect of vertical earth movement on the hard rocky surface ?
- (vii) How can you explain the existence of Coal seams in a coal region ?
- (viii) How do you explain the patches of lava outside the compact lava region ?
- (xi) What part do rivers play in transporting eroded material to other areas ?

Teaching Aids :

- 1. Map of Pangea.
- 2. Geological maps of India showing ancient period.
- 3. Physical map of India.
- 4. Map of India showing distribution of mineral wealth.

Major Idea No. 5

Approach—Same as the previous one.

Activities :

- 1. Draw a map of the western and eastern coasts of India.
- 2. Study the Physical map of India and answer the following questions :—
 - (i) How do you account for the absence of natural harbours on these coasts?
 - (ii) How do you account for the raised-up beach in the western coast region ? Do you suggest submergence or emergence as a cause ?
 - (iii) How do lagoons and creeks abound in western coast ? Do they result from cutting by any source ?
 - (iv) Why do the rivers have no deltas in Western Coast even though they must be transporting sediment with them ?

(v) Why are there so many deltas on the eastern coast ?

(vi) Name the rivers that have big deltas.

Major Idea No. 9

Approach : India is geographically one unit. In spite of different surface configuration in different parts, they are inter-dependent on each other in a number of ways. This fact has to be brought home to the pupils.

Activities :

1. The students may be asked to discuss the following :
 - (a) The role of the Himalayas as a protective wall to India.
 - (b) The role of the Himalayas in supplying perennial rivers to the northern plain and in providing beautiful resources and natural scenery.
 - (c) Part played by Indian ocean, and the Himalayas in the monsoon type of climate.
 - (d) Role of Indian Plateau in the formation of the Himalayas.
 - (e) Complementary nature of the resources of each region.

Evaluation

Listed below are some evaluation exercises.

Essay Type Questions :

1. Contrast the relief of the Himalayan region with that of the Indian Plateau.
2. Describe the drainage of the plains of northern India.
3. Discuss the interdependence of the Physical divisions of India.
4. The Himalayas is a boon to the Indian people. Discuss the statement with concrete examples.
5. The coal seams of India were born in rift valleys. Discuss giving examples.

Short Answer Questions :

1. Give convincing evidences in support of the gradual rising of the Himalayas.
2. How do surface features influence the monsoons ?

3. Name five important passes across the Himalayas.
4. Why has it not been possible to connect India with the rest of Asia by suitable land-routes ?
5. Why is it that there are few natural ports on the coasts of India ?
6. Name the tributaries of the Ganga which flow from the south.
7. Name the rivers of Indian Plateau which flow towards the Arabian Sea.

Objective Type Questions :

1. Given below are some characteristics of India's surface features marked as A, B, C, D and E. Put the relevant letter in the space provided against the statement given further below :
- A. Existence of high mountains in the north.
 - B. Fertility of the plains of northern India.
 - C. Existence of coal in Indian Plateau.
 - D. Paucity of natural harbours.
 - E. None of the above.
- () People entering into India as invaders in the past did not return back to their homeland.
 - () Indian Plateau experienced vertical earth movements resulting in the emergence of the sea beach.
 - () The slope of the Deccan Plateau is to the east.
 - () In Indian Plateau vertical earth movements created faulted basins in which grew thick forests.
 - () Very severe cold winds of China do not enter the territory of India.

Map Questions and Practical work :

1. On the map of the Himalayan region show the following
 - (i) Zoji la, Shipki, Thag la, Lipu lekh, Niti and Gelep la passes.
 - (ii) Sources of the Setluj, the Ganga, the Tista, the Brahmaputra and the Kosi.
 - (iii) The ranges of Laddakh, Dhuladher, Pir Panjal and Nag Tiba.
 - (iv) Mt. Everest, Kanchenjunga, Makalu, Dhaulagiri and Nanga Parbat.

2. On the map of Indian Plateau show the western ghats, Vindhya range, Malva Plateau, Chota Nagpur Plateau and Kaimur range.
 3. Draw a map of the northern Plain of India and show all the rivers in it.
 4. Prepare a physical map of India to show the main relief features.
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SAMPLE TEACHING UNIT-III

CLIMATE OF INDIA

Overview

THE CLIMATE of India affects almost every aspect of life of the country. It is a realistic statement in the light of the fact that about 80% of the population depends directly or indirectly on agriculture. And Indian agriculture is truly said to be a gamble on monsoon. Monsoon is the synonym of Indian climate. The study of the climate of India, therefore, needs special attention of the geography teachers and students.

India is so vast that it, naturally, has many climates instead of one climate. But it has been generalised to call the Indian climate as Monsoon climate. India extends from 7° to 37° i.e. its latitudinal extent is about 30 degrees. The Tropic of Cancer passes through the middle of the country. The east-west extent is also about 30 degrees at the Tropic of Cancer. The width decreases north-ward and south-ward from the Tropic making two triangles with the apex of the northern triangle in Jammu and Kashmir and of the other at Kanya Kumari (Cape Comorin). The northern triangle is adjoined by a large landmass while the southern triangle is surrounded by water bodies and forms a Peninsula.

The configuration, size and extent of the country have very peculiar effects on her climatic conditions. The physiography also plays very interesting role in influencing the diversity of climates. The northern boundary of the country is made by the high-lands of the Himalyas, the highest mountain ranges of the world. To the south of this large highland is a vast and flat plain spread over Punjab, Haryana, Uttar Pradesh, Bihar and West Bengal with a narrow belt extending in the north-east into Assam. To the south-

west of this plain is the desert (arid and semi arid) of Rajasthan. In the central part of the country again there are old hills but not as high as those of the north. They extend east-west and try to reach the northern mountain ranges in the east in the Raj Mahal hills and in the west in the form of Aravalli hills. But they are not successful in their effort except that they become the watershed between the rivers flowing to the east and west.

The peninsular south India has a core in its upland triangle with the northern side made by Central Indian highlands and the other two sides are made by the Eastern Ghats and the Western Ghats culminating in the south in the Nilgiri Hills. The peripheral parts of these upland masses are covered by coastal narrow plains which also culminate in a tapering form at Cape Comorin (Kanya Kumari). This physiography or relief of land of India has moulded climate completely.

All the factors which affect climate of a country viz., the location and extent in terms of distance from Equator (Latitudinal Extent), distance from the sea (Continentality); the height above the sea level (altitude or elevation), and the build of the country (physiography) have collectively given India a variety of climatic conditions from coastal to continental, marine to dry, wet to arid, and warm to cold.

The temperature controls the atmospheric pressure. During summer the north-western part of India develops a deep low which attracts the winds even from south of Equator. During winters this area develops a relatively higher pressure centre giving birth to anticyclonic wind systems. Both of these wind systems are the Monsoons and they control the rainfall regime of the country. The rainfall not only varies in quantity received from place to place but in periodicity and intensity too. The variability in terms of rainfall reliability is also very remarkable. These facts are illustrated by the recurrence of floods or droughts in certain parts of the country every year which give rise to many economic and social problems. These problems are regional in their location but national in their impact.

The climate controls soil formation through weathering and denudation. It also determines the amount of runoff due to rainfall. The erosion of soil is a serious problem of national importance. The variations of climatic conditions control in details the land use, cropping pattern, crops selected and need and nature of irrigation.

The whole human life of the country follows the rhythm of Monsoon. Therefore, a thorough study of the climate of the country is very essential for National Integration.

Objectives

(a) Knowledge and understandings :

1. The climate conditions influence human life in general.
2. India has three distinct seasons, of which rainy season is the most significant.
3. The Monsoon wind system is the main controlling factor of the climate of India.
4. Monsoon rainfall is very unevenly distributed in time and space.
5. The vagaries of rainfall evoke certain national problems as floods and droughts and soil erosion.
6. Climatic and weather studies are very essential for many activities like aviation, agriculture and transportation.
7. Average conditions of all the climatic elements.
8. The variety of resources bringing in interdependence, national unity and integration.

(b) Skills :

1. The pupil is able to study synoptic charts and climatic maps of India.
2. The pupil is able to draw maps showing isotherms, isobars, isohyets and climatic divisions and sketches and graphs to elucidate the weather and climatic conditions of India.

(c) Attitudes :

1. The pupil develops a sense of pride in the location, size and physiography of the country which are responsible for the diversity in climatic conditions.
2. The pupil appreciates the importance of land and water bodies surrounding the country, in determining the climate.
3. The pupil appreciates that the varieties of climates are an asset for the economic development of the country.

4. The pupil develops the sense of sympathy and duty to cooperate with his fellow countrymen in the times of national catastrophes e.g. floods and droughts.

Content Analysis

The content analysis of this unit is given here in terms of major ideas. Each major idea is then broken into important teaching points which a teacher may keep in mind while teaching the unit.

Major Idea No. 1

The climatic conditions influence human life in general.

Main Teaching points :

1. Climate may be defined as average weather and distinction between weather and climate be clearly explained.
2. Climate has obvious influence on basic needs of man e.g. food, clothing, housing and occupations.
3. It determines the amount of water available in various water resources, types of natural vegetation, crops and suitability of a place for human habitation.

Major Idea No. 2

India has three distinct seasons of which rainy season is the most significant.

Main Teaching Points :

1. Summer season starts in April and continues through May and June. In June the sun is overhead on the Tropic of Cancer.
2. It results in the development of Low Pressure over North India and consequently summer Monsoon starts blowing in. Rainy season begins with the advent of monsoons in June and continues upto the end of September.
3. The season from October to March is winter when sun shines overhead in the southern hemisphere, and the northern India landmass develops high pressure with winds blowing out from land to the relatively low pressure area over the ocean.

Major Idea No. 3

The Monsoon wind system is the main controlling factor in the climate of India.

Main Teaching Points :

1. The Monsoon is a wind system with seasonally changing character.
2. It is a direct outcome of the extraordinary pressure conditions that develop in Central Asia and in the north-western part of the country in summers and winters.
3. During summers the Monsoons blow from sea to land *i.e.* from Indian Ocean through Arabian Sea and Bay of Bengal on to the mainland.
4. During winters the Monsoons blow from land to sea *i.e.* from parts of the landmass of India to the surrounded water bodies.
5. Summer's high temperature of the north-western India results in the development of a low pressure which attracts Monsoon on land even from the southern part of the Indian Ocean.
6. The S.W. Summer Monsoons give most of the rainfall.
7. The N.E. Winter Monsoons are generally dry but give rain mainly to the south-eastern coast.

Major Idea No. 5

Monsoon rainfall is very unevenly distributed in time and space

Main Teaching Points :

1. Monsoon gives most of the rainfall after summer season only during the months of July to September.
Nearly nine months remain dry in most of the country.
2. The slopes of the mountains facing the S.W. Monsoon get maximum rainfall.
3. The rainshadow areas and areas in the interior remain dry or comparatively areas very little rain.
4. The period of operation of monsoons fluctuates from year to year.

Major Idea No. 6

The vagaries of rainfall evoke certain national problems such as floods and droughts and soil erosion

Main Teaching Points :

1. The distribution of rainfall during the year is very uneven.
2. This distribution varies from year to year.
3. In a short period of about two months heavy rainfall occurs
4. It gives a huge quantity of run-off which cannot be coped with by the channel capacity of the rivers.
5. This surplus run-off causes floods.
Many parts of the country suffer from inadequacy of water supply because of uneven distribution of rainfall.
6. Soil erosion is a big problem and need be tackled at the national level.

Major Idea No. 7

Climatic and weather studies are very essential for many activities like aviation, agriculture, and transportation.

Main Teaching Points :

1. Aviation depends on fair weather conditions.
2. Agriculture needs sufficient water and sunshine. Study of climate is essential to understand the distribution of crops for a particular area.
3. Transportation is very much affected by floods and heavy rainfall. Breaches in railway embankments, landslides and roads cuttings disrupt transportation.

Major Idea No. 8

Climatic elements delimit the climatic regions

Main Teaching Points :

1. There is a wide variety in sub-types within the framework of monsoon climate.
2. The annual range of temperature broadly increases from south to north and from west to east.
3. The Tropic of Cancer roughly divides the country in halves, the northern sub-tropical and southern tropical.
4. Rainfall distribution divides the country into further divisions.

Major Idea No. 9

The variety of climate has resulted in the diversity of resources bringing in spatial interactions and regional interdependence.

Main Teaching Points .

The resources from natural vegetation, agricultural crops like food grains, oil seeds, fibre crops, cash crops, beverages, etc , and livestock vary from one climatic region to the other. All resources are complementary and supplementary and so a close cooperation is needed for national life.

Teaching Hints :

This section of the unit consists of three aspects. Firstly, the approach to be adopted by the teacher in dealing with the major ideas concerned is described briefly. Secondly, the teaching and learning activities are given which may be profitably used by the teacher according to the convenience and his conviction.

Thirdly, the teaching aids to be used by the teacher are also given.

Major Idea No. 1

Approach : It is a theoretical concept with practical significance. The facts need be clearly presented with the help of definitions of weather and climate. The influence should be explained by pointing out facts from lives etc., in different parts of the country.

Activities :

1. Weather map and climatic maps be studied by students.
2. Pictures of people in summer and winter clothing and rainy season equipment be collected.
3. Group discussion on the weather information given by radio and newspapers be held..

Teaching Aids :

1. Weather maps.
2. Climatic Maps of India.
 - Summer-temperature
 - Isotherms (July)
 - Winter-Temperature
 - Isotherms (January)
 - Summer-Pressures, winds and rainfall
 - Winter-Pressure, winds and rainfall

Major Idea No. 2

Approach : It is a fact which students themselves experience. A factual discussion about season and old division into four seasons by English Geographers be compared with the three Indian seasons. Autumn and spring are not well pronounced seasons in India. Summer, Rainy, and Winter seasons be explained. :

Activities :

1. Students narrate their experiences when summer, winter and rainy seasons begin and end. They divide the year into seasonal calendar.
2. The salient features of each season are noted.
3. Statistics pertaining to temperature and rainfall are studied with average for all India for twelve months and then seasons are delimited with the help of quantification.

Teaching Aids :

1. Monthly temperature graphs for various stations for the whole year.
2. Monthly rainfall graphs for various stations for the whole year.
3. Temperature and Rainfall data available from the Meteorological Stations and Observatories.

Major Idea No. 3

Approach : It is a fact that the distribution of climatic elements, viz, temperature, pressure, wind systems and rainfall vary from place to place and at the same place in different parts of the year, i.e. seasonal change at the same place. The students can bring this point home by comparing the climatic conditions of the home region with any other comparable part of the country. Secondly, the students may be explained the seasonal variation at their own place as they experience it.

Activities :

1. Students may collect climatic data in Geography department or from other sources for a period reasonably long and compare it from day to day.
2. One group may collect such data for one climatic element and the other group for the other.
3. Students draw temperature and rainfall graphs with these data.

4. Students study temperature, pressure and rainfall distribution maps.

Teaching Aids :

1. Climate Maps (INDIA)
2. Synoptic Charts
3. Weather Instruments.

Major Idea No. 4

Approach : The meaning and definition of the Monsoon is explained. Monsoons is a wind system resulting from differential heating and cooling of the landmass of Asia and northwest India. The different approaches about the origin of Monsoon are briefly given. The Indian Monsoon is differentiated from Malayan Monsoon on the one hand and Japanese Monsoon on the other. The classification of Monsoon winds as summer and winter, wet and dry, or South-West and North-East are explained. The influence of Monsoons on rainfall, amount and period, is also explained.

Activities :

1. Students study climatic maps of Asia and find place of India in the broad scheme of continental influence in summer and compare it with that for winter.
2. Students draw diagrams to show the changing direction of Monsoons in each six months period.
3. Students fill in outline maps of India with climatic data and their distribution.

Teaching Aids:

1. Maps of Asia—showing distribution of temperature, January and July, winds and rainfall again for at least January and July.
2. Black Board diagrams of land and Sea Breezes of old concept be compared with the diagrams showing the tracks, disturbances and cyclonic movements of Monsoon.

Major Idea No. 5

Approach : It is a very well established fact. The students may be given examples of home region compared with a comparable area. Examples of extremes like Cherrapunji and Rajasthan be given. Western coastal plain and slopes may be compared with the eastern slopes of the western Ghats. The same place may be noticed on

two climate (Rainfall) maps for summer (July rainy season) and winter (dry season).

Activities:

1. Students study rainfall distribution map for the Rainy Season 'July'.
2. They recognise the rainfall belts in the southern India (Peninsula) which lie north-south and in the northern India they lie east-west.
3. They make a rainfall map by filling outline map of India.
4. They draw rainfall graph for some typical towns of different parts of India.

Teaching Aids :

1. Climatic maps (India) specially rainfall maps.
2. Outline maps of India
3. Graph paper and rainfall data (Monthly) for some typical towns of India.

Major Idea No. 6

Approach : The great problem of soil erosion and damage to life and property due to floods be explained. The help of the knowledge of physical geography about sheet erosion, gully erosion and erosion of Top Soil by run off and rivers be utilised. It is controlled in dimensions by amount of rainfall. Similarly the menace of spread of desert conditions outside Rajasthan be taken up and students be made familiar with the influence of dry climate on soil, natural vegetation and economic losses. Feelings of cooperation and mutual help be developed.

Activities .

1. Students discuss the problem of soil erosion due to floods and heavy rainfall. They give their own experience from rural areas.
2. They make a map of India showing areas of heavy soil erosion.
3. They compare this map with the maps showing areas liable to floods and heavy seasonal rainfall.
4. They collect such information as is available from government agencies.

Teaching Aids :

1. Map of India showing soil erosion areas.
2. Map of India showing the march of desert to the north and north-east,

Major Idea No. 7

Approach : Menace of floods is common in regions of seasonal rainfall. Floods havoc in India has always brought misery to millions of people, particularly in rural areas. Similarly the uncertainty of rainfall and the high variability of rainfall result in droughts in arid and semi-arid parts of the country. The effects of such hazards be brought home to the children. They should be appealed to feel and realise the problem as their own.

Activities :

1. Students collect newspaper cuttings about news of floods during rainy seasons from the newspapers.
2. They also collect similar news items about drought
3. They compile map of India showing floods and droughts.
4. They compare this map with the rainfall map of India.
5. They study the rainfall variability maps.

Teaching Aids :

1. Album of pictures of floods and droughts in various parts of India.
2. Map of India showing variability of rainfall.

Major Idea No. 8

The country should be divided into climatic regions. The basis of classification be explained.

Temperature and rainfall relationship be given emphasis.

Activities :

1. Filling of outline maps of India by students to show the climatic regions.
2. Students should compare the typical temperature and rainfall characteristics of each region.
3. They discuss the natural vegetation, crops and ways of human life in different climatic divisions.

Teaching Aids :

1. Map of India showing climatic divisions.
2. Charts showing climatic divisions and their salient natural vegetation, agricultural crops, animal life and main occupations or way of life.

Major Idea No 9

Approach : The students should be explained the importance of fair weather and visibility for aviation. They can refer to the news items in the news papers about the delay of or cancellation of many flights in urban areas. In rural areas the influence of floods is well known as the transportation is completely suspended. Similarly heavy rainfall causes floods and the railway and road services are completely disturbed or dislocated.

The requirements of various crops and climatic characteristics of various crop areas be comprehended.

Activities :

1. Students discuss the transportation problems in the wake of climatic hazards.
2. They also discuss in groups the relief measures adopted at such occasions as when trains or many villagers or passengers are marooned.
3. They compare crop maps with the rainfall map.

Teaching Aids :

1. Crop Maps of India.
2. Rainfall map of India.
3. Climatic regions map of India.

Major Idea No. 10

Approach : This is the most important aspect in which the students' involvement be acquired. The trade of various commodities between states or parts of the country can be used as a good example to explain this point.

Activities :

1. Students make a list of commodities which their home region produces and sends to other areas.
2. They make a list of those commodities which their home region gets from the other parts of the country.
3. They also discuss the measures of relief etc. taken to cope with the floods, drought and other climatic hazards.

Teaching Aids :

Charts showing trade (inter-regional) commodities in the country.

Evaluation

Listed below are some of the evaluation exercises :

1. Trace the distribution of Temperature in India during (a) the winter season and (b) the summer season. Which parts of India have climate conducive to good health and outdoor work throughout the year ?
2. Discuss carefully the chief features of the summer monsoon rainfall and its importance in the agricultural economy of the country ?
3. Give an account of the distribution of annual rainfall in India. How is it related to the relief of the country ?
4. Divide India into regions according to Climate and give a brief account of each climatic region.
5. Examine the cause of aridity in western Rajasthan.
6. What do you understand by 'Monsoon Climate' ? On what factors does it depend ?
7. Why is the study of the climate of India necessary for understanding its economic geography ?
8. What are the characteristics of Indian rainfall ? Discuss them carefully.
9. Why is the distribution of rainfall all over India not uniform ?
10. It is said that the Indian Budget is a "Gamble in Monsoon." Do you agree with this statement ? Why ?
11. The monsoon is our greater friend and formidable foe. How far do you agree with the statement ? Give reasons.
12. What are Monsoons ? Describe briefly their effect on the economic conditions of India.
13. Give an account of the distribution of rainfall in India. Indicate the relation between rainfall and crop production.
14. Examine the importance of seasons in Indian climate and show their influence on agriculture in your home region.
15. "No factor of his environment exercises a wider influence on man and his economy than climate." Discuss in relation to climatic regions of India.

16. India as a whole has the Monsoon Climate.' How far do you agree ?

Short Answer Type

1. Differentiate between weather and climate.
2. What factors control the distribution of temperature over India.
3. Correlate the temperature distribution with the pressure system on the sub-continent of India.
4. Monsoons are land and sea breezes on a large scale. Discuss.
5. Rainfall distribution in India is guided by relief. Elaborate the statement.
6. Tamil Nadu coast of South India gets most of its annual rain in winter. Why ?
7. Cherrapunji receives highest amount of rainfall in the world. Why ?
8. What is a rain-shadow area? What is the influence of the Western Ghats on the rainfall distribution in the Peninsular India.
9. How many seasons can be recognised in India? Do they vary in their length from south to north. Why ?
10. Name the three places out of the following which have the following climatic data.

Month	Temp. Centi- grade	Rainfall Centi- meters	Temp. Centi- grade	Rainfall Centi- meters	Temp. Centi- grade	Rainfall Centi- meters
January	0.3	7.39	13.8	2.5	21.0	0.1
February	2.6	7.21	16.6	2.1	22.6	0.1
March	8.3	7.17	21.6	1.2	26.3	0.1
April	13.1	9.27	27.8	0.8	29.2	1.5
May	17.7	1.65	33.2	1.3	29.1	2.6
June	21.9	3.56	33.6	7.7	27.5	11.4
July	23.4	5.92	30.9	17.8	25.1	16.6
August	23.8	6.15	29.8	18.3	24.5	9.0
September	20.2	3.89	29.2	12.2	24.8	13.4
October	14.0	2.97	25.7	1.0	25.5	8.9
November	8.1	1.12	19.7	.2	22.5	2.7
December	3.3	3.35	15.2	1.0	20.5	0.3
	Annual Rainfall	66.0	Annual Rainfall	6.66	Annual Rainfall	67.3

2. Correlate the relevant from the following and put in a series.

Name of Place	Height in metres above sea level	Rainfall (Annual) Centimeters
Srinagar	1585	66.0
Bikaner	224	29.1
Allahabad	98	106.2
Calcutta	6	160.2
New Delhi	218	66.6
Poona	559	67.3
Trivandrum	64	169.6

3. Name the climatic regions which have the following data :

- Winters are severely cold. Mean Jan. Temp. is -7.4°C . Daily and annual range of temp. very high. July Temp. 17.2°C . Rainfall varies from 8.3 cm. to 16.9 cm.
- Temperature uniformly high throughout the year in low lands. In hills it does not fall below 18.2°C . in the coldest month. April and May are the hottest months with average temperature of 29.0°C . July and August are coolest months. Heavy seasonal rainfall.
- Rain is scanty; less than 30 cm (12) and most unreliable. Mean monthly temperature is uniformly high in summer. May and June are the hottest months with 50°C . temp. recorded. Temperature below freezing point have also been recorded. No work can be done at midday.

Map Questions and Practical Work

- Draw graphs (line and bar) to show the climatic data given in Q. No. 1 Objective Type.
- Fill in the outline map of India to show the winter rainfall areas.
- In an outline map of India show the summer pressure condition and the direction of winds.
- In an outline map of India show the Tropic of Cancer and pressure conditions in January and also mark the wind directions.

5. Draw selected isotherms for summer by red lines and for winter by blue lines on a map of India.
6. Show the climatic divisions of India in an outline map.
7. Prepare a table showing Climatic divisions, its temp. and rainfall during the year, the natural vegetation, and agricultural crops grown

SAMPLE TEACHING UNIT IV

NATIONAL VEGETATION OF INDIA

Overview

THE extraordinary diversity of natural vegetation that still mantles large parts of the earth's land surface, is one of the most striking phenomena of the earth

The importance of natural vegetation to man can not be over-emphasized. However, as civilization advanced and the population multiplied, the original vegetation cover on much of the land surface was consumed, destroyed, or changed. The result is a greatly altered landscape consisting of modified natural vegetation, tilled fields, planted pastures, buildings, railways, etc., showing clearly the influence of man. In large sections of the Northern plain of India, for instance, it is hard to believe that natural vegetation had at one time consisted of unbroken stretches of tropical deciduous forest, on the other hand even now there are stretches of untouched virgin forests in the inaccessible portions of the Himalayas, still awaiting exploitation.

The basic ideas which this unit is trying to work on are enumerated below :

- (a) That the natural vegetation of a large part of our country has been forest.
- (b) That the type of vegetation which naturally grows in an area depends on the combined influence of a number of geographical factors.
- (c) That the pattern and distribution of natural vegetation in India show great variety.

- (d) That in view of the great economic value of forests as a natural resource, and the every increasing demand on forest-based industries there is an urgent need to expand the total area under forests.
- (e) That continuous onslaughts by man—reckless felling, burning and overgrazing—have destroyed a large section of our forest resources, and that it is the duty of each individual member of the society to help in the conservation of our forests.

Forests play a vital role in the national economy of a country. Apart from the numerous direct benefits from the forests there are also some indirect benefits, such as their protecting the land against soil erosion, helping in flood control, and saving the land from desiccation.

The basic aim of the unit is to develop certain positive attitudes in the pupils, through (i) a sense of pride in our country's resources, and (ii) an appreciation of the role our forests play in our daily life, and of the interdependence of the different geographical regions of India for interchanging their products.

Specific Objectives of the unit

Summarised below are some of the main objectives of the Unit. Only such objectives have been listed here which involve the pupils in thinking critically and in developing practical skills and certain positive attitudes.

(a) Instructional Objectives

The pupil arrives at certain major understandings and generalisations connected with the lesson unit, such as

- (1) The character of natural vegetation of a place depends on its temperature, precipitation, soil and on the extent and nature of man's interference
- (2) To a certain extent the type or/and distribution of natural vegetation in an area influences the climate and soil of that region.
- (3) India displays a great variety in its natural vegetation.
- (4) The distribution of forests in India is uneven.
- (5) The varied pattern of Indian forests makes her different regions interdependent on one another.
- (6) Forests play an important role in our daily life.

- (7) In view of the ever increasing demand for forest products, there is an urgent need to increase the area under forests.
- (8) Reckless exploitation of forests is causing great harm to the economy of India.

(b) *Practical Skills :*

- (1) The pupil draws maps showing the distribution of the different types of forests in India
- (2) The pupil interprets statistical data regarding the area under forests in (a) different states of India, and (b) different countries and draws suitable inferences.
- (3) The pupil prepares simple diagrams connected with the contents of the lesson unit.
- (4) The pupil learns to participate in planning and carrying out of group activities.

(c) *Attitudes :*

- (1) The pupil acquires a sense of urgency regarding the protection of our existing forests and realises the importance of forest conservation programme.
- (2) The pupil understands the part the individual can play (i. e. the part he himself can play) in furthering forest conservation programme.
- (3) The pupil develops an appreciation of the dependence of man on the life sustaining natural resources.
- (4) The pupil develops a sense of pride in his country's national resources.
- (5) The pupil begins to appreciate the part played by forests in our everyday life.

Content Analysis

This unit is presenting the information relating to the natural vegetation of India from certain well-defined perspectives. Without going into the details of the major ideas presented, these perspectives may be briefly stated as follows :

- (a) Natural vegetation depends on various geographical factors. Indian sub-continent displays a variegated pattern in the distribution of its natural vegetation on account of the wide differences between the different regions regarding their climatic and soil condition. Essentially, however, the

natural vegetation of India consists of forests, though there are considerable areas under grass, scrub and deserts too.

- (b) Forests play an important role in our everyday life, whether at home or in the factories.
- (c) Forests are our national wealth. Through centuries of reckless exploitation and through the persistent use of certain malpractices, man has depleted this very important natural resource.

With the above perspectives as background, the content analysis follows the sequence of the major ideas stated earlier as thought processes, and expands each major idea in the shape of relevant teaching points.

Major Idea No. 1

“The character of natural vegetation of a place depends on its temperature, precipitation, soil and on the extent and nature of man’s interference.

Main teaching Points :

1. The character of the natural vegetation of a place depends on two types of geographical factors :

- (a) Physical factors (viz. temperature, precipitation, soil)
- (b) human factors, largely in the shape of man’s interference, e.g. by felling, burning, overgrazing.

2. Temperature determines whether place would have tropical vegetation, or temperate vegetation, or even the Alpine type.

Perhaps the best illustration of the influence of this factor is seen in the way the vegetation changes with altitude above sea-level in the Himalayan region.

3. Variation in species and luxuriance of vegetation depends mainly on the seasonal distribution and the amount of precipitation.

4. Changes in soil condition have occasionally resulted in the introduction of vegetation types which differ from true climatic types (e.g. mangrove swamps which spring up on the fine silt deposited on river deltas).

5. Continued interference by man, e.g. in the shape of burning of forests, constant grazing and reckless deforestation has exerted a powerful influence in deteriorating the vegetational cover and subjecting it to continued changes.

Examples : As a result of man's carelessness 'moist deciduous forest' has, in many areas, degraded into dry savannah and 'dry deciduous vegetation' into 'semidesert scrub.'

Major Idea No. 2

"To a certain extent the type and distribution of natural vegetation in an area influences the climate and soil of that region."

Main Teaching Points

1. Forests play an important part in the maintenance of the hydrological balance of the land.

2. Presence of dead leaves on the forest floor increases the water retaining capacity of the underlying soil. Dampness of the soil raises the humidity of the forested area, while the cool shade provided by the foliage (a) lowers the temperature appreciably, causing a slight increase in precipitation, (b) lowers the rate of evaporation, thus saving the land from desiccation, (c) protects the soil from exposure to sun's rays.

3. The presence of vegetation acts as a physical check to the velocity of the run off and reduces its soil-carrying capacity. Thus forests protect hilly areas from excessive soil erosion.

4. On relatively level ground the presence of trees helps in breaking the force of strong winds, thus protecting the area from sheet erosion.

5. Presence of forests also helps in modifying or building up of soil cover. Dead leaves piling on the forest floor are attacked by micro-organisms present in the soil (viz. bacteria, fungi, protozoa, etc.) to form the dark coloured 'humus', rich in nitrogenous content.

6. Nature of fallen leaves is responsible for the formation of certain specialised type of soils.

Major Idea No. 3

"India displays a great variety in its natural vegetation."

Main Teaching Points

1. Owing to unequal amounts of precipitation in various regions, and varied temperature, soil and biotic conditions, Indian subcontinent displays a very large number of species of plants.

2. Classification of the natural vegetation of India into its sub-types poses certain problems regarding the criteria for differ-

entiation into sub-types, and the extent to which the differentiation should be accomplished.

3. Perhaps one of the finest classifications based on details was the classification of Indian forests by H. G. Champion who distinguished as many as 116 forest sub-types. His classification was later on modified by Dr. G. S. Puri.¹

4. A greatly simplified arrangement of the natural vegetation types of India is suggested below. India's natural vegetation is classified into the following six sub-types :

- (a) Tropical evergreen and Semi Evergreen Forests
- (b) Tropical Deciduous Forests
- (c) Mangrove or Tidal Vegetation
- (d) Dry Savanna and Semi Desert Scrub.
- (e) Desert Vegetation
- (f) Mountain vegetation.

Major Idea No. 4

The distribution of forests in India is very uneven.

Main Teaching Points

1. Variations in relief, climate and soil have resulted in an uneven distribution of forests in India.

2. Large stretches of forests have now been cleared for the sake of cultivation so that cultivable areas show a relatively small area under forests. Only about 7% of India's forests lie in the Northern plain of India.

3. Region-wise it can be said that about 50% of the area under forests is in the hills and plateaus of Peninsular India, about 20% in the Himalayan region and another 22% in the Eastern and Western Ghats and their adjoining coastal regions.

4. State-wise pattern too exemplifies a highly uneven distribution of forests in India.

(See Table given at the end of the chapter for State-wise distribution of forests.)

The states with the largest areas under forest are Madhya Pradesh, Orissa, Maharashtra and Andhra Pradesh, between themselves accounting for approximately 48% of India's forests.

¹ G.S. Puri (1960) Indian Forest Ecology, Vol. 1

Major Idea No. 3

The varied pattern of Indian forests makes her different regions interdependent on one another.

Teaching Points

1. The great variety in the types of forests between the different regions of India results in wide differences between the forest-products of each sub-type.
2. These forests products are often needed in areas far from the original source of the products. The result is that an interchange of different types of forest products takes place.
3. Forest produce includes a wide range of products, many of which are needed in our homes and factories.

Examples :

- (a) Himalayan pines provide soft wood for the match factories and gum for the resin and turpentine factories of Bareilly.
 - (b) Bamboo and Sabal grasses from the foot-hills of the Himalayas supply the raw material to the paper mills of a number of cities in Northern India.
 - (c) Teak wood from Madhya Pradesh is being used in plywood factories of the Uttar Pradesh.
 - (d) Timber from Sal forests in the Terai region of Uttar Pradesh is used in railway sleepers over a large part of India.
 - (e) Firewood from the forests may be used in the homes and factories of the distant cities.
4. Interchange of products clearly makes the different regions interdependent on one another.

Major Idea No. 6

Forests play an important role in our daily life.

Teaching Points :

1. Two types of benefits are obtained from the forests :
 - (a) Direct benefits—relating to products which forests provide for our day-to-day use.
 - (b) Indirect benefits—such as prevention of soil erosion, flood control and saving the land from desiccation, etc.

2. *Direct Benefits*

Forests provide various products which we use in our daily life, whether at home or in factories :

Examples

A long list of products which are obtained from the forests and which we use in our day-to-day life can be easily compiled by the pupils themselves. The list given here is merely a suggested guide line.

- (a) For the *home* forests provide *timber* which in turn (i) helps in house construction (ii) provides wood for manufacturing furniture, packing cases and many other articles of every day use. (iii) fuel in the shape of firewood and wood charcoal.
- (b) Forests provide a large variety of foodstuffs (e. g. nuts and fruits of various kinds.)
- (c) Forests also provide a vast variety of products which we use in our daily life, e. g (i) leather and tanning material for shoes (the former being related to animal life within the forests, (ii) animal furs for clothing, (iii) cellulose for manufacturing paper and rayon, (iv) gums for adhesives and (v) countless other products such as oils, dyes, lac (shellac) and 'katha' (Catechu), etc.
- (d) Forests also supply raw materials for many forests based industries, such as match industry, paper industry, rayon manufacturing, turpentine and rosin factories and so on.

3. *Indirect Benefits*

Examples :

- (a) By providing a physical check to run off, forests help in preventing soil erosion as well as in preventing devastating floods.
- (b) With their greenery, cool shade provided by the foliage, and dampness in the soil on account of the fallen leaves being soaked in moisture, forests help in saving the land from desiccation.
- 4. Forests are a natural resource and, as such, are part of our national wealth. For a very long period man has been exploiting this resource universally. Natural resources now depend on man to maintain a balanced community. The interdependence of man and life-sustaining natural resources cannot be over emphasized,

5. Forests have an aesthetic value, too. A visit to a forest takes the city dweller directly into the realm of nature. The peace and tranquility of the forests soothes his over-wrought nerves. Forests also provide facilities for hunting. Attempts are being made at various places to develop within forested patches a number of recreation grounds, picnic spots and games sanctuaries.
6. In the present day job-oriented world, forests lend a helping hand by providing gainful employment in the woods, cities and in forests-based factories.

Major Idea No. 7

In view of the ever-increasing demand for forest products, there is an urgent need to increase the area under forests.

Main Teaching Points

1. With the progressive increase in population and due to growing industrialization there is an enhanced demand for forest products in our country today.
2. Present production of industrial wood is insufficient to meet the local demand.
3. Compared with some of the developed countries of the world, the production per hectare of wood from Indian forests is proportionately low as per table given below :

Table

Average Annual Production of Wood (Selected Countries)

FRANCE	3.97 cubic metres per hectare per year.
JAPAN	2.61 cubic metres per hectare per year.
U.S.A.	1.26 cubic metres per hectare per year.
INDIA	0.17 cubic metres per hectare per year.

4. The government of India has in recent years been aware of the need to increase the total forested area.

Major Idea No. 8

Reckless exploitation of forests is causing great harm to the economy of India.

Main Teaching Points :

1. Much ignorance exists in our country regarding the need for protecting the forests. "The common man does not visualise

the problem. A vast section of our population has the 'get-rich-quick' psychology and the harmful after-effects of reckless exploitation are not foreseen.

2. Forests play an important role in the balance of nature. Once this balance is upset, wide and far reaching effects may result.
3. Study of trees and forest conservation is important not alone to the individuals or companies working directly with trees and wood products, but to each and every person. It is the duty of each individual to accept the responsibility of wise stewardship of this resource.
4. Protection of the existing forests requires expert and careful management of the forests. Proper management would include safety against (a) fire, (b) pests and diseases (c) man's misuse of the forests. The first two steps are generally in the domain of the forest department, though of course the cooperation of the people is sought for protection against forest fires. Chief difficulty arises with regard to the third step.
5. The prime need for the day is to educate the common man, and secure his active cooperation in conservation programme. The following steps are suggested merely as a guide line :
 - (a) Mobilising public opinion against reckless deforestation, by educating the common man. The harmful effects of reckless felling of trees should be made known to the masses.
 - (b) Bringing to a bare minimum, if not completely banning, the prevalence of such harmful practices as 'JHUMING' (shifting cultivation) and the burning of forests in the lure of securing a richer growth of grass in the next season.
 - (c) Taking remedial steps, such as (i) large scale planting of saplings for example, by active participation in programmes like the 'Vana Mahotsava', (ii) constructing 'fire lines' to break the continuity of forested patches for preventing large scale forest fires, (iii) keeping an effective check on all unauthorised cuttings, (iv) controlling grazing operations in the forests.

establish the inter-relationship between vegetation and the climatic factors.

3. *Group discussions* on such topics as (a) differences between natural vegetation and cultivated vegetation, (b) influence of various geographical factors on natural vegetation, (c) influence of natural vegetation on climate and soil.
4. *Trips/Excursions* to the cultivated fields or woodlands in the neighbourhood of the school, wherever possible, to establish the difference between cultivated vegetation and natural vegetation and to help identify trees or plants belonging to each category separately.
5. *Arranging filmshows/filmstrip or slide projections* on such themes as (a) Forests and Forestry, (b) Trees of different lands, (c) How forests protect our soil and so on.

Teaching Aids :

1. Wall maps (on Natural Vegetation and Climatic Factors, both for India and the world.)
2. Atlases.
3. Charts/Illustrations (prepared by group-activity of the pupils under guidance of the teacher).
4. Specimens (collected by pupils).
5. Films, filmstrips, slides, etc.

Major Ideas No. 3, 4 & 5

Approach :

These ideas are related to the distribution of the chief forest types in India and their varied products. The information presented in Major Ideas 3 and 4 is mostly factual, but the pattern of distribution of the chief vegetation types is a little complicated, and may involve considerable thinking on the part of the pupils. The pupils may be best guided with the aid of a map showing forest types of India. The teacher should guide his pupils into investigating the reasons for the distribution of the forest types in India.

For Major Idea No. 5 the teacher may have to use his imagination to develop such learning activities or situations that pupils are themselves able to relate the various forests types and their products with the concept of interdependence of various geographic regions of India.

Activities :

1. Study of a Wall Map, showing the chief types of forests in India.
2. Atlas study.
3. Preparation by pupils of a map showing forests of India.
4. Preparation of simple cartograms by pupils, based on statistics of state-wise distribution of forests in India.
5. Group discussions and reading of papers.
6. Projection of filmstrips/slides on different types of forests in India, and their products.

Teaching Aids

1. Wall Maps.
2. Atlases
3. Gazetteers/Year Book (for compiling statistical information).
4. Filmstrips/slides.
5. Charts/cartograms prepared by the pupils, or the teacher.

Major Ideas No. 6,7 & 8

Approach :

This particular section of the unit has to be handled very carefully by the teacher. The aim of the entire unit is to develop certain positive attitudes in the pupils. It is important that the pupils feel the urgency of the problems created by man's misuse of the forests. The teacher's task is three-fold.

- (a) to make the pupils appreciate the importance of forests in the light of the various direct and indirect benefits from them.
- (b) to make the pupils familiar with the manner in which forests are misused.
- (c) to build up enough public opinion in his pupils that they feel personally involved in forest conservation programmes.

To the activities suggested below the teacher may have to add considerable imagination, initiative and leadership if he desires this unit to succeed in its final goal. The teacher will do well to ask pointed questions regarding the value of forests and the need for forest conservation.

Activities:

1. An *exhibition* of products from different forests of India—whether obtained directly from the forests or indirectly. Alternately, exhibition may be arranged on such themes as 'WHAT FORESTS DO FOR US' OR 'SAVE THE FORESTS'.
2. Preparation of *Charts*.
3. Compilation of *Illustrations* or *Pamphlets*.
4. Projection of films, slides, filmstrips.
5. Trip/Excursion to nearby areas either where forests have been depleted by man, or where forest conservation programme is being successfully implemented.
6. Taking up **Projects** such as 'Labelling the trees within the School Campus or Beautifying the School Campus, or 'Vana Mahotsave' (i.e. a programme for afforestation).
- 7 **Group discussions** and reading of papers.
8. Preparation of Models on forest conservation theme

} on the theme of
soil conservation.

Teaching Aids:

1. Charts, illustrations, pamphlets relevant to the subject matter.
2. Specimens—collected by pupils.
3. Cartograms—related to comparative importance of different forest products.
4. Films, slides, filmstrips on 'Forest products' or 'Forest conservation'

Evaluation

Enlisted below are certain evaluation exercises. Teachers may adopt them to suit their needs.

Short Answer Questions:

1. Would it be true to say that forests provide us with food and clothing?
2. Why does India have a lower per capita area under forests than USSR?
3. What do you understand by the term 'forest based industries'?

4. Give the meanings of the terms 'Afforestation' and 'Deforestation'.
5. Suggest one way in which forests are useful to the railways of India.
6. Name four important Indian forest products and state where each is obtained from.
7. Why is the 'Vana Mahotsava' celebrated annually in our country?
8. "Forests provide employment to the people". Would you be inclined to believe this statement?
9. Why should the common man be concerned with the conservation of our forests.
10. Would it be true to say that deforestation of the forests can result in serious soil erosion?
11. In what way has man's misuse harmed the forest resources of India?
12. Why does the Indian subcontinent show an uneven distribution of forests?
13. "Reckless hewing of trees in the hills may result in serious floods in the lowlying areas "Why?
14. Why are our 'Five Year Plans' concerned with the development of our forests?
15. Outline important uses of the timber obtained from the Indian forests.

Essay Type Questions:

1. Name the geographical factors influencing natural vegetation and examine briefly the influence of each factor.
2. "Forests are our national wealth", How far do you agree with this statement?
3. What do you understand by the statement that only 76.8% of the total forested area in India is exploited? Give reasons to explain why 23.2% of the forested area is not exploited at present.
4. Why are conservation measures necessary for Indian forests?
5. You have been newly appointed as the local conservator of forests in some part of India. Outline the steps you would take to educate the general public and mobilise their help in forest conservation programme.

6. Divide India into its main forest types, explaining briefly where each type is located.
7. Study the map of annual rainfall of India given in your atlas or text-book and compare it with the map of the forest types of India given in the National Atlas

What relationship do you notice between the distribution of annual rainfall, and that of the different types of forests ?

8. Study the table showing the state-wise distribution of forests, given at the end of this chapter and then answer the following questions :
 - (a) Which state contains the largest share of India's forests? Why?
 - (b) Why do Haryana and Punjab have a relatively small share of India's forests ?
9. Study the table given below of the composition of India's forests in 1968-69 and then answer the question listed below the table.

(Data Compiled from 9.10 Indian Forest Statistics, Bulletin 9, Revision 1, July 1971)

All India Area Under forests.		(By composition (In Thousand Hectares)			1968-69
Total Forest Area	Conferous	Non-conferous (Barod leaved)			
		Sal	Teak	Others	Total
75,273	4182	9973	8687	52431	71091
Percentage 100.0	5.6	13.2	11.5	69.7	94.4

- (a) Why does India have a relatively small area under coniferous forests?
- (b) Sal and Teak together cover nearly a quarter of the area under forests. How far are climatic conditions responsible for this?

10. Explain the utilities of forests in the economic life of India.
11. Explain why in recent years there has been considerable progress in the production of timber in India.
12. Estimate the forest resources of India. Which part of India are important timber suppliers?

Objective Type Questions :

Listed below in column 'A' are five main types of forests of India, and in column 'B' the names of some important trees associated with them, but in the wrong order. Match the column A with the column B.

'A'	'B'
Mangrove or Littoral Forests	TEAK
Tropical Thorn Forests	DEODAR
Temperate Hill Forests	SUNDRI
Tropical Evergreen Forests	BABUL (Acacia)
Tropical Deciduous Forests	ROSEWOOD

Map Questions and Practical Work:

1. Draw a map of India showing the distribution of the chief forest types.
2. On an outline map of India print the names of the following trees to mark the exact location where each of the following trees may be expected to grow:
Sal, Deodar, Sundri, Teak, Bamboo.
For each tree print at only one location.
3. Construct by group activity models or charts on such themes as
 - (i) Value of forests to man;
 - (ii) How forests prevent soil erosion,
 - (iii) Save the forests.
4. Construct a simple cartogram to show state-wise distribution of forested area in India. Statistics may be taken from the table given below:

**Table to Show State-Wise Distribution of
Forests in India**

State	Area under Forest in thousand Hectres	All India per- centage to total forest Area
Andhra Pradesh	6,410	8.5
Assam (including Meghalaya)	4,588	6.1
Bihar	3,059	4.0
Gujarat	1,863	2.5
Haryana	135	0.2
Himachal Pradesh	2,158	2.9
Jammu & Kashmir	2,104	2.8
Kerala	1,059	1.4
Madhya Pradesh	17,169	22.8
Maharashtra	6,658	8.8
Mysore	3,510	4.7
Nagaland	210	0.4
Orissa	6,746	9.0
Punjab	197	0.2
Rajasthan	3,760	5.0
Tamilnadu	2,214	2.9
Uttar Pradesh	4,872	6.5
West Bengal	1,183	1.6
Total (States)	67,980	90.3
<i>Union Territories</i>		
Andaman & Nicobar Island	776	1.0
Goa, Daman & Diu	105	0.1
Manipur	602	0.8
Arunachal	5,154	6.9
Tripura	630	0.9
Others	26	Negligible
Total (All India)	75,273	100.0

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SAMPLE TEACHING UNIT V

SOILS OF INDIA

Overview

SOIL is one of the most fundamental natural resources. It is rightly reckoned as the most important natural wealth of a nation and as such it has its national importance. The entire agricultural production of a nation is directly the result of soil fertility and its careful conservation. Its overall significance in our entire life warrants us to think about its proper care and conservation at the national level.

Soil is an outcome of the weathering processes as well as biological process. It involves, therefore, the interaction of climate, vegetations, rocks and micro-organisms. The pupils must be led to understand the value of coordination in the processes of nature.

Soil is a dynamic substance in which at all times of the year, there is a never ending activity of an enormously large and varied population of micro-organisms including bacteria, antinomycetes, fungi and yeasts. A good vegetative cover promotes the proper operation of the hydrologic cycle.

Soils of our country provide a variegated base for growing food and commercial crops for human beings, fodder for animals and many other types of vegetation as the sources of wood and timber. The broad base of our agrarian economy is largely the outcome of basic geographical factors like physiography, climate and soils.

The attention of pupils must be drawn to the fact that they may understand how importance is the soil management for economic development of the entire country.

Objectives

Given below are the three main significant instructional objectives which should be kept in mind while teaching the soils of India. These objectives are (A) knowledge objectives (B) Skill objectives (C) Attitude objectives.

(A) *Knowledge and Understanding Objectives :*

- (1) Soil is a thin layer of loose material found on the surface of the earth.
- (2) Soil is the result of the action of the weather on the surface of solid rock over a very long period.
- (3) Many biological processes are required to make the soil capable of supporting rich plant life.
- (4) The depth of this layer may vary from a few centimeters to several meters.
- (5) Soil is a mixture of organic and inorganic materials.
- (6) The size of rock particles determines how much water and air will enter into soil and remain there.
- (7) India's soils are generally grouped into four major and four minor categories.
- (8) The soils of India are considered as one of the most fertile soils of the world.
- (9) An attempt to obtain quick returns from the soil on a short term basis is the basic cause of soil exhaustion.
- (10) Different types of methods will have to be used to prevent erosion.

(B) *Skill Objectives :*

- (1) Skill to show and fill in the outline map of India the different kinds of soils.
- (2) Skill to draw a map of India showing the drainage system of India.
- (3) Skill to prepare charts of concept of soil, its formation and soil conservation.
- (4) Skill in collecting specimens of different soil types and classifying them.
- (5) Skill to locate and compare the soils of different areas.

(C) *Attitudinal Objectives :*

- (1) Pupils appreciate that the soil is the free gift of nature and the study of soils of India is very essential to understand country's agricultural diversity.
- (2) Pupils realise that it takes thousands of years for the top soil to be formed and so it cannot be replenished easily when lost.
- (3) Students should realise that man's activities may speed up or slow down the slow natural process of soil erosion.
- (4) Students appreciate that the diversity of soil type distributed in the country are a great natural resource.
- (5) The pupils should appreciate that different methods will have to be used for soil conservation.
- (6) The students have sympathetic attitude towards the life and activities of the people of different regions of India.

Content Analysis

Major Idea No. 1 (A) What is Soil ?

Soil is the top-covering over most of the land surface of the earth. It is made up of two major things: (a) Particles of varying size of the rocks and their minerals and (b) living things and their remains.

(B) Composition of Soil

The chief constituents of soil are (a) pieces of rocks mixed with minerals (b) Humus (c) Water (d) Air (e) Organism. Physically the soil is a mixture of mineral particles of varying sizes. Chemically the soil contains a variety of inorganic materials such as nitrates, sulphates and phosphates etc.

Major Ideas No. 2 How is Soil Formed ?

Three different types of nature's processes are essential before the soil becomes fertile enough to support much plant life. The three processes of weathering are: (a) Physical (b) Chemical and (c) Biological Weathering:

(a) Physical Weathering :

Two general ways in which soil is first formed are :

- (i) Action of weather on rocks causes them to decompose into particles of varying size.
- (ii) Water, winds and glaciers carry soil to other areas
- (b) *Chemical Weathering* :
Compounds of rock material are formed by agents of weathering on land surface.
- (c) *Biological Weathering* :
Micro-organisms do various activities which help in the biological soil processes. Many soils when first formed or deposited will not support much plant life. Usually they do not have enough food in them to allow complex plants as wheat, corn etc. to grow. The soils can grow crops only after they undergo many changes. The most important biological processes are nitrogen fixation and cellulose decomposition : These activities are processed by the action of micro-organisms.

Major Idea No 3 : Characteristics of Soils

Following characteristics of Soils have to be borne in mind :

- (a) *Depth* : The depth of top-soil and sub soil has to be taken into consideration because this gives one clue to the extent of fertility.
- (b) *Structure* : How well various grains that make up the soil cling together ? In ideal soil each grain is not entirely separate. Humus is valuable because it helps particles to cling together.
- (c) *Texture* : What is the size of the grain that make it up ? Size makes the particles sand, clay or silt.
- (d) *Chemical make up* : Plants obtain food from soil. Chemical composition of soil influences the health of animals through vegetation.

Major Idea No. 4 : Classification of Soils of India :

Many classifications have been put forward, according to the (a) geological group (b) formation (c) origin (d) texture (e) colour (f) and agricultural utility. The following classification is mainly based on agriculture utility and is accepted by Indian Council of agricultural Research (I. C. A. R.) New Delhi.

We can classify the soils of India into four major and four minor types. When teaching the distribution of these various types of soils in the country the students should be told the importance of the contributions made possible by this diversity to national resource in the form of soil fertility and different vegetational production.

Major	1. Alluvial soils
	2. Black soils (Regur)
	3. Red Soils
	4. Laterites and Lateritic soils
Minor	5. Forest and upland soils
	6. Desert soils
	7. Saline and Alkali soils
	8. Peaty and marshy soils.

(a) Major Types

(i) *Alluvial Soils*—It is one of the most important soils of India contributing the largest share to the agricultural wealth of the country. These soils are represented in the soil map of India by (1) Alluvial Soils (2) Coastal alluvium (New) (3) Grey and Brown Soils (4) Gangetic alluvium (calcareous) soils. These soils cover 1,500,000 Sq Km. in area.

Alluvial soils comprise the whole of Sutlej-Gangetic plain of Punjab and Haryana, U.P., Bihar, West Bengal, Brahmaputra Valley of Assam, deltaic areas and the Coastal plains of Andhra Pradesh and Tamil Nadu. Certain alluvial soil groups are devoted to the cultivation of cash crops while others are devoted to cultivation of foodgrains. Delta Soils of the Ganga are devoted to jute cultivation.

(ii) *Black Soils*: The black soil is also known as 'Regur' which has been derived from the Deccan trap of old lava deposits, covering an area of about 546,000 Sq. Km. It is also known as 'Trap Soils'. These soils include (5) deep black soils (6) medium black soils (7) Shallow-black soils (8) mixed red and black soils (9) skeletal soils on the soils map of India.

Western part of India (Maharashtra, West Part of Madhya Pradesh and part of Mysore) has this category of soils which was formed by the decomposition of lava. Rivers have carried this soil to other areas.

Black soil group is important for growing cotton, a crop important for cotton industry in India.

(iii) *Red Soils* : These soils include (10) Red and loamy soils (11) Red Gravelly Soils (12) Red and Yellow soils. These soils occupy large areas in Tamil Nadu, Mysore, South East Maharashtra and extend through the east of Andhra Pradesh and Madhya Pradesh to Orissa and Chhota Nagpur, covering an area of about 350,000 Sq Km. Fertile areas of these soil groups are important for foodcrops. Young soils grow rubber, tea, coffee etc.

(iv) *Laterite and Lateritic Soils*: These soils are represented by (13) Laterite soils (high and low level) (14) Lateritic soils (old alluvium) in the soil map of India, covering a total area of about 248,000 Sq. Km.

These soils are well developed on the summits of hills of Mysore, Kerala, Madhya Pradesh, Eastern Ghats regions of Orissa, Maharashtra, West Bengal, Tamil Nadu and parts of Assam. Important areas of these soil groups are devoted to the plantation of crops, fruit and garden crops.

Minor Types

(v) *Forest and Hill Soils* These soils include (15) Forest and Hill soils (16) Sub-mountane regional soils and (17) Foot-hill Swampy soils (Terai) on the soils map of India. These soils cover an area of about 285,000 Sq. Km. in nearly 18 p.c. of the total area of the country.

(vi) *Desert Soils* : These soils are represented in the soil maps of India by (18) Desert soil (Grey and brown). A large part of the arid and semi-arid regions of Rajasthan, Southern Part of Punjab and Haryana (lying between the Indus and the Aravalli Hills) covering an area of about 142,000 Sq Km. is affected by desert conditions of geologically recent origin.

(vii) *Saline and Alkali Soils* : These soils include (19) Saline and Deltaic (alkali) soils in the soils map of India. Saline soils are characterised by the occurrence of high proportion of soluble salts. These salts occur in a variety of soils and are found among the groups of Red, Black and Alluvial soils. In case of soils which occur close to the sea the salinity is due to the activity of sea water and salts. Enhanced salinity is due to the removal of salts. These soils are not suitable for cultivation 'Reh' is extracted for the consumption by the washerman.

(viii) *Peaty and Marshy Soils.* In the soils map of India, these soils are represented by (20) Peat Soils, and cover an area of about 150 Sq. Km. These soils popularly known as 'Karl' in Kuttanad in Kerala are submerged in water during Monsoon. These soils are found in coastal tracts of Orissa, Sunderbans (West Bengal), the central portion of N. Bihar, Almora district of U.P. and the south-east Coast of Tamil Nadu.

Major Idea No. 5—How is soil depleted :

Cultivated land can be seriously damaged by soil erosion. The soil will be easily exhausted by not fertilising it and by failing to take measures that would prevent soil erosion.

Two major factors which are mainly associated with soil erosion are (a) water and (b) wind.

(a) *Water*—Rain water can erode top-soil by washing it off.

Tree, grass or crop cover breaks the falling rain and guides seepage to storage regions. Unprotected Soil on even the slightest slope is exposed to the strong cutting and washing effects of the run-off. These effects produce *sheet-erosion*, *rill-erosion* and finally *gully erosion* which can cause utter ruin of a countryside.

(b) *Wind*—In dry and semi-arid regions reckless cultivation may break soil out of grass or other protective cover and may destroy the structures of the soil to change it into sand and dust. When such fields are exposed to winds, dust storms blow away dust particles.

Major Idea No. 7 How can soil be conserved ?

Agriculture is the chief basis of our country's economy. Hence, the key to our sound and all-round economic development is the systematic progress of our agriculture. It means that the prosperity of our people is mainly dependent on the proper utilization of our soils. The following are some of the measures for soil conservation :

- (a) Excessive deforestation to be discouraged. Afforestation where deforestation has been excessive has to be encouraged.
- (b) Grazing to be economically practised on a long-term basis.
- (c) An optimal soil structure and organic matter content to be maintained.
- (d) Contour cultivation, strip cropping, and terracing to be practised in areas with much slope.

- (e) Special ploughs which leave soil surface in cloudy condition to be used in dry or Semi-arid areas.

Suggested Activities

Major Idea No. 1—What is Soil ?

(1) Let children bring samples of different kinds of soils and put them in a big glass jar. Add water and shake the jar. Let the jar stand-still for a few hours and encourage the children to observe the different layers formed in the jar.

Explain to the class why *Humus* is at the top, afterwards, are the *clay, silt, and sand* and at the bottom is only *gravel*.

(2) A chart showing layers of soil may be made on the black board and the students may be asked to copy it on their notebooks.

Major Idea No. 2—Formation of Soil

The students may be taken to a river to show them the river deposits on the bank and at the bottom.

They may be shown the activities of earth worms and these experiences may be used to explain the work done by bacteria.

A discussion may be held to explain how soils are formed. one help of filmstrips and diagrams may be taken.

Major Idea No. 3—Characteristics of Soils

(a) The experience of class with regard to soil layer on hill-sides and plains may be exploited in order to explain the depth of the soil.

(b) Structure will have to be narrated but a discussion must follow to make the ideas clearer.

(c) Charts can be prepared to depict the texture of the soil.

(d) Chemical make up of the soil will again have to be narrated

Major Idea No. 4—Classification of Soil

This idea is related to the distribution of the chief types of soil in India. Map of India may be prepared and the students ought to be asked to make their own maps. The students may be well guided and explained with the aid of the map, showing soils in India as referred in school Atlas (Survey of India)

Major Idea No. 5—Soil Depletion

This section of the unit has to be handled very carefully. It is important that the pupils feel urgency of the problem created by nature.

Examples from Terai region may be given to explain this idea. Examples of the Chambal ravines may also be used. Examples of uneasy life in the Chambal ravines because of robbers may be discussed in the class.

Major Idea No. 6—Soil Conservation

This idea ought to be analytically handled so as to develop the reasoning power of the students. Soil conservation and its problems may be fully discussed.

Evaluation

(a) Essay type questions

- (1) What is soil ? How is it formed ?
- (2) What are the major forces in the formation of soil ?
- (3) On an outline map of India, show the major classification of the soils of India.
- (4) How can we guard against the danger of soil exhaustion?
- (5) What is the importance of soil to man ?
- (6) What are the characteristics of Indian Soil ?
- (7) What methods should be used to improve the fertility of the soils ?
- (8) Explain the effect of vegetative cover on soil.

(b) Short Answer Questions :

- (1) Explain how water helps in the decomposition of solid rock.
- (2) What is the effect of air on rock decomposition ?
- (3) When a plant dies, what happens to its remains ?
- (4) How may soils become poor ?
- (5) How can we guard against the danger of soil exhaustion?
- (6) What is the importance of soil to man ?
- (7) What are the characteristics of Indian Soils ?
- (8) What methods should be used to improve the fertility of the soils ?

(d) Imaginative Type Questions :

- (1) Suppose you are made the Agriculture Minister of India. How will you react to jhumming cultivation of Assam?

(2) Supposing you own a farmland in Garhwal district of Uttar Pradesh. What precautions will you take to avoid soil erosion ?

(3) Prepare a scheme of soil conservation in Rajasthan.

(4) Examine a hill side that is covered with *trees*, another covered with *grass*, another cleared and under cultivation:

(i) From which will the rainfall run-off most quickly ?

(ii) From which will it carry the most soil ? Explain why.

(d) *Objective Type Questions :*

(1) Below there are two columns A and B. Match the statements in column A to the statements in column B.

Column 'A'

Column 'B'

(a) Soils carried by rivers

(i) loam

(b) Soils blown by winds

(ii) till

(c) Soils developed by glaciers

(iii) loess

(iv) alluvium.

(2) Below are some statements, some of which are true and some are false. Write down 'T' when the statement is true and 'F' when the statement is false.

(i) () Action of weather allows the soil to grow complex crops.

(ii) () Good vegetative cover promotes the proper operation of the hydrological cycle.

(iii) () Two main factors concerned in the destruction associated with soil erosion are water and wind

(iv) () The size of the grain that makes up soil, determines its chemical make-up.

SAMPLE TEACHING UNIT VI

TRANSPORT IN INDIA

Overview

THE natural resources of a country vary from place to place. Man develops these resources for comfortable living and the perpetuation of his life. No region is, however, self-sufficient in the various requirements of its inhabitants. Almost all the regions of India exchange surplus goods and foodstuffs for mutual benefits. Thus different parts of the country are interdependent.

Gone are the days when people had very few needs and tried to be self-sufficient. Now an area produces goods not only to meet local needs but also the needs of other areas. Regions having surplus agricultural produce such as food grains, cotton, sugar, oils, etc., despatch them to the areas which are deficient in them. Raw materials are hauled to the industrial centres and manufactured goods to the consuming areas. For the movement of the raw materials, manufactured goods, food-stuffs etc. adequate, cheap, and quick transport is essential. Thus transport facilities are necessary for the economic development of an area. Means of transport promote not only production and trade but also urbanization, dispersal of population and uniformity in the prices of different commodities. By bringing the different parts of a country close to each other, means of transport tend to reduce the regional imbalances and thus contribute to the development of a country. Transport which plays a vital role in stepping up the production and consumption of various kinds of goods and in the movement of people, is also a measure of the level of civilization of a country. In fact civilization progresses as the means of transport develop.

Various means of transport are used for conveying goods and passengers from one place to the other in India. Men and animals continue to serve as means of transport in certain parts of the country. In the well-drained areas of low relief and dense population where both agricultural and industrial activities are pronounced, railways and roads are the important means of transport. Country boats, steamers, etc., carry passengers and goods in the humid areas having numerous deep rivers, lagoons or lakes. Trade between the countries separated by wide expanses of oceans is carried by ships. Air transport forms an important means of carrying passengers over long distances. This kind of transport has become very popular in large countries like India, the U.S.S.R., Canada, the U.S.A., Australia, etc. All the different means of transportation supplement one another and function in unison.

The teacher should help the students to study the development of transport in the light of the variable character of geographical conditions. He should also emphasize the role of transportation in bringing about national integration by bridging the vast distances amongst the different parts of the country. Relation of one type of transport to the other and interdependence among different regions for economic activity should be emphasized.

Emphasis should also be laid on various model centres like Delhi, Kanpur, Nagpur, Bangalore, Bombay, Calcutta, etc., where different means of transport converge.

Objectives

(A) Major Understandings :

1. Transport plays a significant role in the economic and cultural development and defence of the country. It facilitates the movement of men and their thoughts to distant places and thus ushers in a well-knit culture and well integrated society.
2. Different means of transport are used in India.
3. Railways are the most important means of transportation in India.
4. Topography and productivity of land determine to a great extent the concentration of railways.
5. Different gauges of the railways obstruct free flow of traffic.

6. The Indian Railways have been divided into nine zones for better control and efficient running of the trains.
7. Roads take precedence of railways in the mountainous and economically backward areas, and supplement other modes of transport.
8. Progress in the development of road transport has been relatively slow in India.
9. Development of air transport in India is favoured by her vast size, location and suitable climate.
10. Inland waterways are of some significance in Assam, West Bengal and Kerala states and less important in other parts of the country.
11. India's maritime location in South Asia and existence of good harbours both on the eastern coast and the western coast promote her shipping activities.

(B) Skill Objectives :

1. The pupil draws maps showing major relief features, passes, principal rivers, navigational canals and backwaters of India.
2. The pupil locates in the maps of India, the position of ports, railways, highways, routes, oceans routes and important towns.
3. The pupil locates India in relation to the international trade routes.
4. The pupil draws simple diagrams for comparing route kilometrage of India's railways and roads with those of other important countries, and for comparing the kilometres flown by India's airways with those flown by other important countries.

(C) Attitudinal Objectives :

1. The pupil develops a sense of pride in his country's different means of transport.
2. The pupil realises the unifying effect of transport.
3. The pupil realises how one part is dependent on the other parts of the country for sustenance and economic progress.
4. The pupil develops a feeling that there is an urgency for the development of transport facilities in the country.

Content Analysis

The content analysis of this unit is given in terms of major ideas. Each major idea is split into important teaching points which may be kept in mind by the teacher while teaching this unit.

Major Idea No. 1. Transport plays a significant role in the economic development and defence of the country. It facilitates movement of men and their thoughts to distant places and thus ushers in a well-knit culture and well-integrated society.

Important Teaching Points :

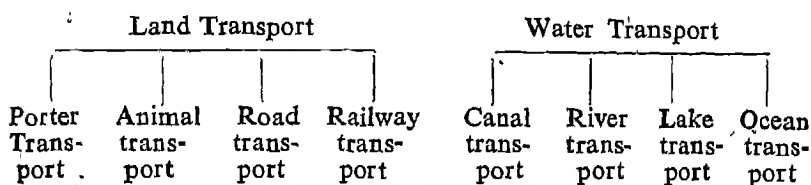
1. Some areas produce food grains, industrial raw materials and manufactured goods more than they need.
2. The production of such commodities and goods will be stepped up if there are means to transport them to the areas of consumption. For example, raw jute is transported to Calcutta for the manufactures of jute goods which are further despatched to the various consuming areas and markets in India and abroad. Similar references can be made to gypsum, iron ore, tea etc.
3. Adequate and cheap means of transport promote not only production of agricultural commodities and industrial goods but also trade, urbanization and uniformity in the prices of different articles.
4. Transport evolves a society in which different members appreciate the problems of one another and help in resolving them.
5. Transport also plays a significant role during such emergencies as famines, floods, earthquakes, etc. when adequate relief measures are rushed to the affected areas with the help of quick means of transport.
6. When danger of war looms large, fighting forces and their arms and equipment are despatched from the far-off interior locations to the frontier for the purpose of defence.
7. Books, magazines and newspapers are transported from one part of the country to the other. Learned persons, students, political leaders, etc., tour different parts of the country to meet people, exchange views, appreciate difficulties and assess the advancement in various fields and thus take the nation a step forward to the fusion of thoughts and well-integrated society.

Major Idea No. 2

Different means of transport are used in India

Important Teaching Points :

1. Development of various means of transport depends on the nature of relief and size of the country, stage of industrial development, size of foreign trade and the cost involved.
2. The quantum of goods and passengers to be transported and the speed of their movement determine the mode of transport.
3. Passengers and goods move not only on land and water but also by air. The different means of transportation are divided into three major categories, namely, (1) land Transport, (2) Water Transport and (3) Air Transport. Land and water transport are further sub-divided.



4. Porters, Mules, ponies, goats, yaks etc. carry goods and passengers in the difficult terrains of the Himalaya. Camels are used for carrying goods over vast arid and semi-arid north-western India. They generally move goods and passengers from rail and road-heads to different destinations. They are slow moving and carry a small quantity of goods. These means of transport though old and out-dated are the only conveyance available in the far flung inaccessible terrains of the country where roads and railways have not penetrated. In the towns and mining areas porters and animals are still used for carrying goods from one place to the other.
5. Before the advent of automobiles, animal driven carts and carriages were supreme on the roads. In the undeveloped areas, they still hold sway over the highways and cart-tracks. They, however, can serve short routes. In the various parts of the country, motor lorries and buses are the most important means of conveyance on the roads. They generally carry passengers

and goods from rail-heads to their respective destinations. In the areas where there are no railways, lorries and buses are the principal means of transport. As compared to railways, they are quick and almost handy services for short distances and convenient for conveying goods and passengers to their destinations. Motor vehicles can ascend steep slopes more easily than railways. Moreover it is cheaper to construct and maintain roads than railways. In the mountainous areas, therefore, motor-transport has assumed greater importance. It is specially used for the prompt transportation of perishable goods namely fresh fruits vegetables and milk.

6. Railways constitute the principal means of transport in India. They are bulk carriers, fast, safe and dependable. Being very suitable for conveying goods and passengers over long distances in our vast country, they will remain the leading means of transport. They haul coal, iron, steel, cement, sugar, food grains, cloth, timber, cotton, salt, machinery, etc. from the producing areas to the consuming areas emphasizing interdependability between two parts of the country and thus exercise unifying effect. Goods for export are carried by the railways to the ports and the imported goods from the ports to the various parts of the country. Initial cost of the rolling stock and laying of the railway track is very high. In the rugged mountainous areas the cost is exorbitant.
7. Aeroplanes fly in the air. Huge sums of money spent on the construction of roads, railway, tunnels, etc., need not be spent in respect of air transport. But the amount spent on the purchase of aeroplanes, spares and on the training of the personnel manning them runs very high. It is the fastest available means of conveyance and now quite popular for transporting passengers and mail. Being costly, it is used for conveying only those goods which are of a small size, light weight and high value. At the time of war, armed forces and light equipment can be carried to the forward areas within a few hours. Since time is a very important factor in war, this type of transport is evidently of immense value. Some of the advantages of aeroplanes

are unique. They are commonly used for spraying insecticides on crops, for dropping paratroops and food, and for conducting aeromagnetic survey.

8. In some parts of India, canals, rivers, lagoons and seas are commonly used for transporting goods and passengers. Before the year 1853, there were no railways in India and very little water of rivers was diverted into canals for irrigation purposes. Boats carrying goods and passengers including army personnel moved on the rivers. Many commercial and administrative towns were set up on the banks of big rivers, e.g., Patna, Varanasi, Allahabad, and Kanpur on the Ganga, Delhi on the Yamuna, Cuttack on the Mahanadi and Vijayawada on the Godavari. At present water transport is insignificant in the Punjab and Uttar Pradesh states. Since rivers, canals, lagoons or lakes and seas can be used directly for plying boats, steamers, ships, etc., amount of money spent on the constructions of roads and railways is saved in the water transport. Bulky goods can also be carried easily by water transport. Boats and steamers are slow moving crafts but cheaper than railways and automobiles. They are, therefore, used for conveying bulky goods of low value. In India, canals, rivers and lakes generally dwindle during the hot dry months and may be too shallow for plying boats and freighters. They are generally flooded during the rainy season and are dangerous for shipping. Patronage given to the railway transport by the government had also a crippling effect on the inland water transport. This mode of transport has not, therefore, become popular except in a few parts of India.

Major Idea No. 3 :

Railways are the most important means of transport in India.

Important Teaching Points :

1. Railway transport was introduced in India in 1853, when 32 km. long railway-line was laid between Bombay and Thana.
2. No other country except the U.S.A. and U.S.S.R. has as long a route kilometrage as India has. Route Kilometrage during the year 1968-69 was 60,014.

3. Indian Railways carried 6.1 lakh passengers and 5.59-Lakh tones of goods every day during 1968-69. The Indian Railways carry about three-fourths of the total goods conveyed by all means of transport in India.
4. Railways transport all kinds of goods in general and bulky goods in particular to far off places. Of the total goods carried by the railways during 1968-69, coal accounted for 33.48%, metallic ores 11.38%, food grains 7.73%, iron, steel and machinery 4.78% cement 4.75% and salt 1.33%. Other goods carried by the railways are sugar-cane, oilseeds, raw jute, tea, sugar, raw cotton, cotton textiles, paper, petroleum products etc.

Major Idea No. 4 :

Topography and productivity of land determine to a great extent the concentration of railways.

Important Teaching Points :

1. There is a dense network of railways in the Ganga Plain, the Gujarat Plain and in the states of Haryana, the Punjab and Tamil Nadu. These areas are mostly flat, alluvial, agriculturally very productive and densely peopled. A large volume of traffic either originates or is booked for these areas.
2. Highly rugged mountainous areas are either without or have very few railways. Nagaland, Manipur, Meghalaya and Jammu and Kashmir states, and the Union Territories of Arunachal and Mizoram have no railways. Most of Himachal Pradesh and the Himalayan tracts of Uttar Pradesh are also without this means of transport. Only four railways-Pathankot-Jogindernagar, Kalka-Simla, Hardwar-Dehra Dun, Siliguri-Darjeeling penetrate for some distance into the Himalaya.
3. Very thinly populated areas of forested Bastar district of Madhya Pradesh, the Orissa Hills, the Western Ghats and arid Sandy areas of the Rajasthan Desert have very few railways.
4. The belt of the West Coastal Plain lying between Bombay and Mangalore is generally hilly and is crossed by many creeks. No railway runs on this plain from Bombay to Mangalore.

5. In the Indian Plateau, railways prefer to follow flat river valleys and cross hilly areas through gaps or passes. Poona-Raichur railway section follows the valley of the Bhima, Amraoti-Surat railway section follows the valleys of the Purna and the Tapti, and Khandwa-Bombay railway section takes advantages of the valley of the Tapti and the Burhanpur Gap, the valleys of the Girnar and a few other streams. Since the Western Ghats rise very steeply from the West Coastal Lowlands, very few passes or gaps cross them. These mountains are crossed by the Nasik-Bombay railway section through Thal Ghat, the Poona-Bombay railway section through Bhor Ghat, Coimbatore-Shoranur railway section through Shencottah Gap. A railway section connecting Marmagao with Londa also crosses the Western Ghats.

Major Idea No. 5 :

Different gauges of the railways obstruct the free flow of traffic.

Important Teaching Points :

1. Most of the railways were constructed by contractors under certain terms of contracts which they had concluded with the government.
2. During the early stage of the development of railways in India it was found that the construction of broad gauge railway was two and a half times costlier than that of metre gauge line.
3. There was a great demand of certain agricultural raw materials in England. The raw materials were to be hauled to the ports for onward trans-shipment to England and the imported manufactured goods from the ports to the internal markets. Very few lines were laid in the mineralized areas having rich potential of industrial development. The north-eastern part of the Indian Plateau has many minerals but very few lines.
4. It was felt urgent to extend railways with a view to strengthening internal security of the country. They were also extended into those areas which were sparsely populated and where famines were a big scourge of life.
5. Economy in the construction of railways was the main

consideration which prompted the government to introduce metre and narrow gauges in India. Kilometrage of Government Railways on March 31, 1969 was 59550. Of this total kilometrage, broad gauge (track width 1.676 metres) accounted for 49%, metre gauge (track width 1 metre) 43.4% narrow gauge (track width 0.762 metre and 0.610 metre) 7.5%.

Most of the main routes (Delhi-Calcutta, Delhi-Madras, Delhi-Bombay, Bombay Calcutta, Calcutta-Madras) have broad gauge lines. There are certain stations where railways of metre and broad gauges meet and the passengers are obliged to change trains when goods are shifted from the wagons of one kind of railway to that of the other, e.g., metre gauge line to that of the broad gauge line and vice versa. Transshipment of goods and passengers involves extra cost causes delays.

7. Trains of broad gauge lines have advantages of greater capacity for carrying goods and passengers and faster speed as compared to those of metre gauge lines.
8. It is cheap to construct metre gauge and narrow gauge lines in mountainous and difficult terrains. In the areas where passengers as well as goods traffic is small trains running in such lines are economical.

Major Idea No. 6

The Indian Railways have been divided into 9 zones for better administrative control and efficient running of the trains.

Important Teaching Points :

1. The entire Indian Railway system (excluding 461 km. of narrow-gauge feeder railways) is owned by the Government of India and is held under the charge of the Union Ministry of Railways.
2. The Railway Board which is answerable to the Ministry of Railways, is responsible for the control and administration of the Indian Railways.
3. The Railways have been divided into 9 zones each managed by a General Manager.

Zone	Headquarters	Route Kilometrage as on 31.3.69.		
		Broad Gauge	Metre Gauge	Narrow Gauge
Southern	Madras	2,334	4,957	153
Central	Bombay	4,593	383	796
Western	Bombay	2,761	6,079	1,202
Northern	New Delhi	6,899	3,432	260
North-Eastern	Gorakhpur	52	4,913	—
Eastern	Calcutta	4,013	—	131
South-Eastern	Calcutta	5,323	—	1,479
N.E. Frontier	Maligaon (Gauhati)	645	2,899	87
South-Central	Secunderabad	2,606	3,183	370

4. State boundaries have not been taken into consideration in demarcating the railway zones.

Major Idea No. 7

Roads take precedence of railways in the mountainous and economically backward areas and supplement other modes of transport.

Important Teaching Points :

1. Roads are only second to the Railways in transporting goods and passengers from one place to the other.
2. They have been classified into (a) National Highways, (b) State Highways, (c) District Roads and (d) Village Roads.

National Highways constructed and maintained by the Union Government, connect large towns, ports, capitals of most of the States and neighbouring countries. National Highways No. 7 is the longest highway in India. It is 2283 km. long and connects Varanasi, Rewa, Jabalpur, Nagpur, Hyderabad, Madurai and Kanyakumari. National Highway No 6, the second longest highway in India is 1654 km. long and connects Nagpur to Calcutta. The third longest highway is National Highway No. 5. It connects Baharagora, Cuttack, Bhubaneswar, Vishakhapatnam, Vijayawada and Madras.

State Governments are responsible for the construction of state Highways, District Roads and Village Roads. State Highways link district head-quarters and important industrial and commercial

centres. District Roads connect commercial and industrial centres, with one another and with the railway stations of National Highways and State Highways. Village Roads which are mostly unmetalled connect the villages with one another and with District Roads.

3. In the mountainous and sparsely populated areas, road transport is more economical than railway transport. In Jammu and Kashmir, Meghalaya, Manipur, Nagaland and Mizoram states and Union Territory of Arunachal where railway transport is non-existent, road transport is the major mode of transport. In Himachal Pradesh and the Kumaun Himalaya where railways provide transport to a very small area, road transport is almost the only means of transport available to the people.
4. Roads not only connect villages and the centres of industries, commerce and trade with the railway stations but also with river ports, aerodromes and sea ports.
5. In the towns and cities of India, road transport (city bus, motor taxi and scooter rickshaw) is indispensable to the workers working in the factories, offices, business establishments etc.
6. This mode of transport plays a vital role in the national integration. Tourists and pilgrims move by personal or hired cars and buses to far-off places in the country, mix up with the people of other states, appreciate their attainments in culture and other spheres of life and thus generate a feeling of emotional integration.

Major Idea No. 8:

Progress in the development of road transport has been relatively slow in India.

Important Teaching Points:

1. Before motor transport was introduced in India, there were very few roads. They were either unsurfaced or gravelled roads and were constructed mainly with a view to connecting the administrative headquarters and frontiers with the capital of the country.
2. Some roads were constructed for serving as feeders to the railways but the progress was very slow,

3. It was only in 1898 that India started importing motor vehicles and it was only after the First World War that motor transport in India could establish itself.
4. After Independence many new roads, bridges and culverts were constructed. Kilometrage of metalled roads increased from 145,855 in 1947 to 324,940 in 1969 and that of unmetalled roads from 242,371 in 1947 to 324,940 in 1969 and that of unmetalled roads from 242,371 in 1947, to 647,390 in 1969. Though there had been an appreciable increase in the kilometrage of roads, we had in 1969 on the average only 30 km. of roads for every 100 sq. km. of areas and 181 km. for every 100,000 persons.
5. The number of motor vehicles has also increased considerably after 1947. It rose from 212,000 on 31st March, 1947 to 1,333,000 on 31st March, 1968. On 31st March, 1968, the number of public service vehicles was 82,000, that of private cars and jeeps 523,000 and that of goods vehicles 286,000¹. The other vehicles were motor cycles, auto-rickshaws and miscellaneous vehicles. Some countries even much smaller in size than India have many times more motor vehicles on their roads. For example, in 1967, France had 11,500,000 passenger cars and 2,681,100 commercial vehicles. West Germany 10,864,500 passenger cars and 891,900 commercial vehicles and Japan 3,836,000 passenger cars and 6,214,000 commercial vehicles².
6. Even after Independence, construction of roads could not make much headway due to various reasons. There is a chronic shortage of steel and cement (required for the construction of bridges), road machinery and coal-tar in India. In some parts of the country road building materials namely road-metal and coal-tar are not locally available. They are to be hauled over long distances. Coal-tar is produced mainly in Bihar and West Bengal states. The road metal for the Plains of Northern India is collected mainly from the foot hills of the Himalaya.
7. The density of motor vehicles per km. is very low in India. It is about 0.93 in India as compared to 5 in Ceylon, 8

¹ India, A reference Annual, 1970

² S K. Srivastava-Economic of Transport 1971, Page 230.

in Malaysia, and 13 in the U.S.A. Thus there is a great scope of increasing the number of vehicles which is just adequate for meeting the country's requirements, but the number of scooters and passenger cars is inadequate. The price of the motor vehicles manufactured in India is also very high. Steps are being taken by the Government of India for increasing the production of scooters and passenger cars.

Major Idea No. 9

Development of air transport in India is favoured by her vast size and suitable climate.

Important Teaching Points:

1. India is the seventh largest country in the world and her area is 3,268, 090 sq. km.
2. Distances between important towns are very long.
3. Owing to her location in South Asia, international air-routes connecting countries of Europe, West Asia, and North Africa with Australia and those of south-east Asia, pass through India. Palam (New Delhi), Santa Cruz (Bombay), Meenam-bakkam (Madras) and Dum Dum (Calcutta) air ports are also used by international airlines.
4. India is essentially a tropical country. Therefore, fog which reduces visibility and thus is inimical to the landing of aeroplanes, is rare in India. Dry season in India is very long and it varies from about 9 months in north-west India to about 7 months in Kerala State. Even during the rainy season there are long spells of dry days.
5. India has made a significant progress in the development of air transport after Independence. Though commercial air transport was introduced in India on December 30, 1929 when the flights of the aeroplanes flying from England to Karachi was extended to New Delhi, progress made by civil aviation in India had been poor until independence. Many new aerodromes have been constructed and fast moving jet planes have been purchased from other countries with the result that number of passengers and freight carried by the aircrafts in India have increased appreciably.

Civil Aviation in India¹

Particulars	1947	1951	1961	1969
Kilmoetres flown (million)	21.59	42.03	53.95	71.17
Passengers carried (million)	0.31	0.52	1.08	2.65
Freight carried (million kg.)	3.92	99.46	84.10	42.11
Mail carried (million kg.)	0.64	3.26	7.53	12.1

6. The Indian Airlines Corporation operates flights between important towns of India and links Burma, Bangla Desh, Nepal, Afghanistan and Ceylon to India. Since land routes connecting towns of Assam, Meghalaya, Tripura, Mizoram and Manipur with Calcutta being circuitous are very long compared to air routes, commercial air transport for moving passengers from some towns of Assam and other neighbouring States to Calcutta and back is very important.

Major Idea No. 10 :

Inland waterways are of some significance in Assam, West Bengal and Kerala States and less important in the other parts of the country.

Important Teaching Points :

1. Rivers are the most important among the inland waterways. They are also source of water for navigable canals, lakes and lagoons.
2. Only those rivers are used for navigation purposes which are perennial and deep enough to permit the steamers to ply throughout the year. As far as possible they should be straight and free from shoals, large meanders and severe floods.

¹ India, A reference Annual 1970

3. Since rainfall is seasonal, many rivers in the Indian Plateau and in the Plains of Northern India are shallow and unsuitable for plying even country boats and barges during the long dry period.
4. Kilometrage of navigable waterways in India is 14000. Of this total length, 35000 k.m. are navigable for steamers. The Brahmaputra below Dibrugarh, the Ganga below Kanpur, delta canals of the Godavari, Krishna and Cauvery, Orissa Coast Canal, the Damodar Canal, Circular canal and Eastern Canal in West Bengal, the Buckingham Canal, lagoons and canals of Kerala States and numerous estuaries of small rivers on the west coast of India are navigable. The Hooghly, the Brahmaputra below Dibrugarh, and the lagoons and canals of Kerala state are extensively used for inland navigation.
5. Steamer navigation was introduced for the first time in the Ganga Delta in 1823. Since there were on railways and motor vehicles to compete with and since very little water was drawn from the Ganga and the Yamuna for irrigation purposes, steamer services linked Calcutta to far off places like Agra. Construction of railway network during the later half of the nineteenth century coupled with the withdrawal of water by canals (Lower Ganga canal completed in 1878, Upper Ganga Canal completed in 1884, Western Yamuna Canal completed in 1886, Agra Canal opened in 1874) discouraged river navigation and crippled it by 1900.
6. Movement of passengers and goods has gone up so much in the recent past that railways and motor vehicles are unable to cope with it efficiently. There is, therefore, a great scope of the development of canal and river transportation in India. The Government of India are studying the feasibility of undertaking river transport on commercial basis and are acquiring the services of the U.N.O. experts for this purpose.

Major Idea No. 11

India's maritime location in South Asia and the existence of good harbours both on the eastern coast and the western coast, promote her shipping activities.

Important Teaching Points :

1. India is an old maritime country. Her merchant ships carried goods of various description to the Persian Gulf countries and East Africa in the west and countries of southeast Asia in the east before European ships appeared on the India Ocean.
2. Penetration of the Peninsular India deep into the south has brought India not only near the international trade routes of the world but also the countries which surround the Indian Ocean.
3. Seasonal reversal of the monsoon winds gave such advantages to the sailing ships as are not found in the other parts of the world. There are very high mountains in the north and east of India. Interior of Asia being arid and sparsely populated has very little to trade with our country. India's trade with other countries is, therefore, mainly by sea.
4. Being an old maritime country, India had the acumen of trading with other countries. Despite this advantage many of the ships owned by the Indians could not compete with the ships owned by Englishmen due to the patronage given by the then Government to British ship-owners and the rate wars launched by the British shipping companies against the Indian shipping companies. As a result of this, many Indian shipping companies incurred heavy losses and were wound up.
5. The Indian-owned tonnage in 1946 was only about 100,000 G.R.T. (gross registered tons). Soon after Independence, the Indian shipping companies were given loans for purchasing more ships. Indian tonnage, therefore, rose to 400,000 G.R.T. in 1955 and to 2,329,000 on March, 1970. Total number of ships registered in India on March 1, 1970 was 258. Of this total, 177 ships were engaged in the oversea trade and 81 in the coastal trade.
6. Cargo liners, tankers and passenger-cum-cargo ships have been registered in India and they operate on all the important ocean routes of the world. Our entire coastal trade is carried by the ships registered in India but a large part of our trade with other countries is carried by the ships registered in other countries.
7. Most of our exports and imports are handled by the ports of

Calcutta, Bombay Madras, Marmagao, Cochin Vishakha-
patnam, Kandla and Paradip. These are the major port of
India.

Teaching Hints

In this part of the teaching unit, twelve major ideas have been grouped into eight sections. These sections can, however, be reorganised by the teacher to suit his own views and requirements. Each section has been dealt with under three sub-sections, viz.,

- (i) the approach to be adopted by the teacher in dealing with the major ideas concerned.
- (ii) the teaching-learning activities which may be made use of by the teacher, and
- (iii) teaching aids.

Approach teaching-learning activities and teaching aids may be made use of in accordance with the convenience and the requirements in the major idea.

Specific Hints :

Major Idea No. 1

Approach:

This sub-section needs to be handled carefully since it enables the pupils to develop positive attitudes and open-mindedness. The teacher may, therefore, lay stress on interdependence of different parts of the country and its unity in the light of means of transport.

Activities

- (1) Some issues for discussion are as follows :
 - (a) "No part of India is economically self-sufficient"
Examine the statement.
 - (b) "Transport is absolutely necessary for the economic growth of a country". Discuss it with reference to India.
 - (c) "Transport eliminates isolation and promotes broad-mindedness and political unity," Comment.
 - (d) "There being always some trouble on India-Pakistan border, India cannot afford to be logistically weak", discuss.

- (2) Draw maps of India showing (i) areas producing a few surplus agricultural and industrial products and areas deficit in these products, and (ii) places where Pakistan launched invasion against India.

Teaching Aids :

1. Map of India showing areas producing tea, jute, cotton, sugarcane, cotton textiles, jute textiles, iron and steel.
2. Map of India showing Indo-Pakistan wars of 1965 and 1971.

Major Idea No. 2

Approach :

The content to be studied in the context of this major idea demands deep thinking. The reason why different means of transport are used in India, may be stressed. The pupils may be asked to study maps showing relief, drainage and important towns (including ports) of India and to study the location of India in relation to the position of other countries in the light of suitable questions. This may be followed by group discussion.

Activities :

1. An exhibition of photographs displaying porters, bullock-carts, mules, goats and yaks carrying goods, lorries, buses, scooter-rickshaws carrying passengers and goods, passenger and goods trains, aeroplanes, boats and steamers plying in rivers and canals, and ocean ships may be organised.
2. The students may be asked to prepare diagrams showing (a) approximately the speed of a porter, lorry, train, aeroplane, steamer and ship and (b) the approximate weight of goods carried by them.
3. Study of the relief map of India.
4. Study of the map of the world, laying stress on the location of India on the northern shores of the Indian Ocean and the international ocean routes.
5. Group discussion about the role played by the different means of transport.

Teaching Aids :

1. A relief map of India.
2. A political map of India.
3. A map of the world showing ocean routes.

Major Idea No. 3 :

Approach:

The context being mostly factual, the students can assimilate it more easily if they find out these facts themselves. This can be achieved by asking the pupils well-planned questions.

Activities :

1. The following questions may be asked.
 - (i) What is the total route kilometrage of the Indian Railway ?
 - (ii) Find the first five countries of the world having the longest kilometrage and show their kilometrage with the help of the diagrams.
 - (iii) "Railways are the most important means of transportation in India."
2. Draw bar diagrams to represent the various kinds of goods carried by the *Indian Railways*.

Teaching Aids :

1. India, A Reference Annual, 1970.
2. Statesman's year Book for finding statistics in respect of the railways of different countries.

Major Idea No. 4, 5 and 6.

Approach : Since topography determines to a great extent the direction and density of railways, the teacher may emphasize that railways prefer to follow level stretches of land with minimum number of obstacles. He may also stress that economy had been the major consideration in laying the railways of the metre and narrow gauges. While stressing these points, he may not lose sight of the fact that the production capacity especially in respect of commercial crops and the density of population of the areas also influence the direction and density of railways. Study of maps should form an important part of the teaching learning procedure.

Activities :

1. The students may be asked to find out in an atlas the railways connecting important towns (Bombay-Madras, Bombay-Calcutta, Bombay-Delhi, Delhi-Madras) and explain the nature of topography over which the railways run.

2. The pupils may show on map of India the tracks of the main railways of broad, metre and narrow gauges.
3. Group discussion on (a) advantages and disadvantages of railways of different gauges, (b) advantages of broad gauge over those of metre and narrow gauges may be arranged.
4. The pupils may show on a map of India, the different railway zones and their headquarters.

Teaching Aids :

1. A relief map or relief model of India.
2. Railway Map of India showing different gauges of the railways.
3. Railway map of India showing different railway zones.

Major Idea No. 7 & 8

Approach : The teacher may start by explaining basic concepts such as relief of India and low cost involved in the construction of roads as compared to railways in the highly rugged areas. Role of National Highways, State Highways, District Roads and Village Roads may be stressed mentioning how they serve as arteries of commerce and national integration.

Activities :

1. Discussions may be held on the following issues
 - (a) Road transport is indispensable for the existence of large towns and cities.
 - (b) Road transport plays a very significant role in national integration.
2. The following questions may be asked
 - (a) What is the kilometrage of metalised roads in India ?
 - (b) What progress has the construction of roads made in India after Independence ?
 - (c) What are the major causes of low density of roads in India ?
3. Pupils may draw on a map of India, the National Highways running closest to the town where they live.

Teaching Aids :

1. Map of India showing roads.

2. Map of the home state of the pupils showing state Highways, District Roads and the Village Roads.
3. A large-scale map of a big town showing industrial, administrative and shopping areas and roads.

Major Idea No. 9

Approach : India is a country of large size. The importance of air transport which is the fastest available transport, may be emphasized. Natural advantages which favour air transport in India may be explained to the pupils. The fact that international air-routes pass through India may be brought home to the pupils by well-planned questions.

Activities :

1. The pupils may find out the time taken by express trains from Delhi to Madras and from Calcutta to Gauhati and compare it with the time taken by aero-planes between these towns.
2. India has made a significant progress in the development of air transport in India after 1947". Comment
3. The pupils may be asked to draw a line graph to show the rise in the kilometres flown by the Indian aeroplanes after 1947.
4. They may be asked to draw main air-routes on a map of India.
5. They may show international air ports in a map of India.

Teaching Aids :

1. A wall map of India showing air-routes.
2. All-India Railway Time Table and Air Time Table.
3. Statesman's Year Book.

Major Idea No. 10

Approach : The teacher may bring home to the pupils, the geographical factors which favour inland navigation in some parts of the country but disfavour it in the other parts of the country. The pupils may be asked to study maps showing annual and seasonal rainfall, drainage and important canals in the light suitable questions.

Activities :

1. Discussions may be held on the following statement :
"There is a great scope of the development of canal and river transportation in India."

2. The following questions may be asked :
 - (a) What is the kilometrage of navigable waterways in India ?
 - (b) Why did steamer navigation faced near extinction after the construction of the railways throughout the country?
3. Pupils may be asked to draw on a map of India the inland navigable waterways.

Teaching Aids

1. Rainfall maps of (a) hot and dry summer season, (b) hot and wet season and (c) winter season.
2. The National Atlas of India for drainage and inland waterways of India.

Major Idea No. 11

Approach :

In the beginning the teacher may emphasize that India is an old trading country and discuss the advantages possessed by her maritime location. Steps taken by the government of India for increasing the Indian tonnage may be brought home to the pupils in clear terms.

Activities :

1. Discussions may be held on the following statements :-
 - (a) "India's trade with other countries is mainly by sea."
 - (b) "Many of the Indian shipping companies failed to compete with the foreign shipping companies during the British rule".
2. The following questions may be asked.
 - (a) How far does the location of India help her in her maritime trade with other countries?
 - (b) What role did the seasonal reversal of the monsoon winds play in the development of her trade with other countries ?
 - (c) What progress has the Indian tonnage made after 1947 ?
 - (d) Which are the major ports of India?
3. Pupils may show on a map of India the major ports of our country.
4. Pupils may draw international trade routes connecting the major ports of India with the ports of those countries with which we trade.

Teaching Aids :

1. Photographs/slides of various types of ocean-going ships.
2. A map of India showing ports.
3. A map of the world showing international trade routes.
4. An epidiascope.

Evaluation

Some of the evaluation exercises are given below.

Essay Type Questions

1. Explain the role of the means of transport in the national integration of India.
2. Contrast the distinctive features of railways, roadways, airways, and waterways as means of transport.
3. Examine the influence of relief on the direction and concentration of railways in India.
4. Why are there different gauges of railways in India? Should India have only one gauge of railways? If so, Why?
5. "Inland waterways are poorly developed in India." Discuss.
6. Analyse the distribution of roads in relation to the geographical environment in India.
7. Explain why pack animals are still common means of transport in some parts of India.
8. Examine the geographical conditions which favour the development of air transport in India.
9. "Air transport has unique advantages and limitations." Examine this statement.
10. Write a detailed note on the role of road transport in the cities of India.
11. How far does India's maritime location in South Asia promote her shipping activities?

Short Answer Questions

1. When was the railway transport introduced in India for the first time?
2. What is the route kilometrage of the Indian Railways?

3. Name the countries whose route kilometrage of railways exceeds that of India.
4. Why is there no railway on the west coast plain connecting Bombay and Mangalore ?
5. Name the different gauges of railways in India.
6. Into how many zones have the Indian Railways been divided ?
7. Name the headquarters of the South Central Railway.
8. Name the different classifications of roads in India ?
9. Name the national High way which passes near or through your town ?
10. Who is responsible for the construction and maintenance of the National Highways ?
11. When was first motor vehicle imported in India?
12. What is the increase in the kilometrage of metalled roads after 1947 ?
13. What is the increase in the number of motor vehicles after Independence?
14. "There is a great scope of increasing the number of vehicles on the roads of India." Do you agree with this statement? If so, why ?
15. When was the commercial air transport introduced in India for the first time ?
16. In which parts of India commercial air transport is commonly used ?
17. Name the air ports of India which are used by the international airlines of the world.
18. How many passengers are carried by the Indian aeroplanes in a year ?
19. What is the kilometrage of navigable waterways in India ?
20. When was steamer navigation introduced in India for the first time ?
21. Name the areas where inland waterways are extensively used for the transportation of goods.
22. "There is a great scope of the development of canal and river transportation in India."

Do you agree with this statement. If so, why ?

23. Why was the number of Indian owned ships very small before 1947 ?
24. What steps were taken by the Government of India to increase the number of India-owned ships after 1947 ?
25. Name the major ports of India.

Objective Type Questions

1. Fill in the blanks by selecting one of the words given within brackets ;
 - (a) The headquarters of the Southern Railway are at..... .. (Secunderabad, Madras, Coimbatore).
 - (b) The headquarters of the North-Eastern Railway are at . (Gorakhpur, Lucknow, Calcutta).
 - (c) The National Highway No.....is the longest highways of India (1,5,6,7).
 - (d) The Bhopal-Kanpur Railway Section follows for quite a long distance theValley. (Betwa, Tapti, Bhima).
 - (e) Lagoons and canals are commonly used for transporting goods and passengers in.....State. (Tamil Nadu, Gujarat, Kerala).
 - (f)River is extensively used as waterway in Assam. (Ganga, Brahmaputra, Cauvery).
 - (g) Bullock-cart is the most important means of transport in ..,of India (Villages, towns, cities)

Map Questions and Practical Work.

1. On an outline map of India, show the Railway tracks running between Bombay and Calcutta (Via Nagar), Madras and Delhi, Calcutta and Jaipur, Delhi and Gauhati, and Bombay and Amritsar.
2. On an outline map of India show any four of the National Highways.
3. On an outline map of India show the waterways used mainly by
 - (i) steamers,
 - (ii) ships and
 - (iii) Country boats.

4. On an outline map of the India Ocean, show
 - (i) International Ocean-routes and air-routes passing through India, and
 - (ii) Important sea ports and air ports of the countries surrounding the Indian Ocean.
5. Write a brief account of the different means of transport shown on a Quarter-inch top-sheet (available from Survey of India, Hathibarkala, Dehra Dun).

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